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Notes of the Month

COTTON GINNING IN SUDAN, UGANDA, AND TANGANYIKA

At a spinner-breeder conference held in Liverpool and Manchester in July 1959, it was remarked that while considerable research had been done into cotton breeding and growing and into spinning, little had been done into ginning. There was a general feeling at the conference that this should be remedied and accordingly the Empire Cotton Growing Corporation arranged with the British Cotton Industry Research Association that Mr. Tippett should make a short survey of the ginning industries of Sudan, Uganda, and Tanganyika with a view to making suggestions on research. The survey was made during February and March 1960 and the following is based on the report, which is printed in full in "The Empire Cotton Growing Review," July 1960, pp. 196 - 208.

FOR a cotton spinner the quality of a bale of cotton depends not only on the general quality of the fibre resulting from the combined efforts of the breeder and cultivator, but also on the way the cotton is dealt with between picking and baling in the sequence of operations associated with ginning. For example, the presence of extraneous material such as jute fibre, of crushed seed and discoloured or stained lint, and the regularity of quality within and between bales, are very important to the spinner and are affected by ginning and its associated operations. It is important, too, that the actual ginning should not damage the staple. Accordingly it is of more than usual interest for spinners to know how these operations are carried out in the various cotton-growing countries, what are the difficulties in the way of producing regular, clean lint, what efforts are made to overcome these difficulties and to market lint of consistently high quality and in what directions changes are taking place. These are the topics of the present article.

Sudan

In the Sudan Mr. Tippett visited the ginneries of the Sudan Gezira Board, private and government ginneries run much along the same lines as those of the Sudan Gezira Board, and the government ginneries of the Nuba Mountains. The Gezira ginneries deal with the long staple Sudan Sakel and Lambert cottons grown under the Gezira irrigation scheme. The seed cotton is put by the cultivator into large good-quality jute sacks, each containing about 300 lbs., in the field immediately after picking, and is delivered to the ginnery in the sacks. As a result, the cotton reaches the ginnery substantially free from that "extraneous matter" such as threads of jute which is such a potential trouble in the other cotton growing areas mentioned in this report.

At the ginnery each sack is weighed and the seed cotton graded by classers. There are six main grades together with half-grades and two recognised categories below grade six. This initial classification is based mainly on the appearance of the fibre, but freedom from leaf and trash is also taken into account. At the beginning of the season, the assessments of the many classers at the ginneries are checked by the head classer or his representative from Port Sudan so as to maintain a consistency of assessment. (A second and more detailed assessment of the grade of the lint in lots of bales is made at Port Sudan for marketing purposes.)

The sacks of seed cotton are then stacked in blocks in the ginnery compound, each block containing sacks of one grade only, and there being many blocks for each grade. At any one time, only one grade is processed in one section of the ginnery. Sacks from several blocks are emptied into the bins from which the gins are fed, so that cotton of that grade from several areas is mixed. The object is to average out slight variations in actual quality within a grade and so produce for each grade even-running quality. All the Gezira cotton is processed on roller gins, and in the orthodox pattern of ginnery the feeding of seed cotton to the gins, the collection of lint, and the feeding and "trampling" of the lint in the bale press, is done by hand and foot. Consequently there are many people in the ginnery and the scene is one of crowded and bustling activity. Lint from forty gins is collected together and put into the same bale—a further help to mixing and even-running quality.

Overlooking.—The operation of the gins is under the supervision of "gin carpenters" responsible for seeing that the lint is satisfactory and free from such defects as crushed seed, and for taking such corrective steps as are necessary. In addition to coping with troubles as they arise the carpenter has, as a routine, to re-set the fixed knives at intervals of about six hours. As far as I could see, the gin carpenters do not work to a standardised system, but exercise their individual skill as craftsmen. Some of the gin settings, notably the "overlap" between the fixed and moving knives, are stable and usually are specified, simple gauges being provided. A head gin carpenter having charge of several ginneries inspects each gin at intervals, checking all settings and the general condition of the gin, especially of the knives, and arranging for corrective action where necessary.

Labour Economy.—Cleanliness in the ginnery is important and there are several operatives who collect fly and any material that should not get into the lint. The whole procedure at the Gezira ginneries seems to be well established and calculated to produce uniformly good lint, with little regard being paid to labour economy. Demand for labour in the Gezira tends to outrun supply, and is likely to do so even more in the future when the large schemes for expanding cotton production get under way. Consequently,

experiments in mechanisation are being made in a number of directions.

Some gins have been fitted with a so-called automatic feed ("semi-automatic" would be a better term). In this, a hopper is kept supplied by hand and from this a regular feed to the gin is produced automatically. One operative can attend to three or more (the makers claim ten) gins with the help of this, as compared with the conventional one gin per operative. It is possible too, that the more uniform rate of feed achieved automatically leads to a quality of lint that is more uniform from time to time and it should lead to a higher rate of production if used to the best advantage. Of the ginneries I visited in this area, none had adopted this semi-automatic feed completely.

At one ginnery (the Hamadnallah Ginning Factory, a private concern serving privately owned growing fields) there was installed a pneumatic system for transporting seed cotton from the store where the sacks are emptied and distributing it in the factory into positions behind the gins, when it is taken by hand. This seemed to save only a little labour, but was thought to eliminate a lot of dust from the cotton and so produce a cleaner atmosphere as well as cleaner lint.

At the Hasa Heisa ginnery of the Sudan Gezira Board there is an American installation that achieves a high degree of mechanisation. Cotton is taken pneumatically from the mixing bin and fed through Mitchell cleaners to 60-in. Murray gins. The lint delivered from the gins falls on to a fast moving conveyor belt from which it is collected in a pneumatic trunk, and is delivered from a cage into the automatic trampler for baling. After the cotton is emptied from the sacks into the bin, it is not handled until the bale is removed from the press.

Changes Afoot.—Clearly changes are occurring, and it is important to work out the economies of the various systems and their practicability from the standpoint of maintenance under the conditions obtaining in the Sudan. The classing authorities were concerned, too, about the appearance or "preparation" of the lint, which is affected by the method of collection. It is a matter for investigation to discover how important this is to spinners. Any observer from a European or American industry would be struck, as I was, by the extent to which heavy bags and bales of cotton are manhandled. It is possible that substantial savings in labour and costs could be fairly quickly achieved by ordinary engineering method and layout studies and by adopting suitable mechanical handling equipment such as moving cranes and fork-lift trucks.

Moisture Control.—Another feature of the conventional procedure that seems to require improvement is the control of the moisture in the cotton as baled, since the addition of moisture is necessary under the very dry conditions obtaining. On the platform before the baling press the lint is spread out and water is sprayed from a syringe. The cotton is then tossed up by boys to mix the moisture-laden fibre with the rest—a picturesque if dusty procedure. This is repeated and the cotton is then baled. There seems to be no knowledge of how much moisture is in the cotton as it reaches the bale, or of how much needs to be added. However, the automatic methods of lint collection have, or can have, incorporated in them continuous and controllable methods of adding water, and if they are likely to be adopted it may not be worth while trying to improve the conventional procedure. The Nuba Mountains cotton industry is quite different from that of the Sudan Gezira Board. Not only is the cotton shorter in staple (about $\frac{15}{16}$ in.), but it is produced under raingrown conditions by cultivators who have only small holdings and many of whom live under primitive conditions.

Only Three Grades.—Each delivery of cotton is put into one of only three grades, and the ginnery aims to process only the first grade until that is exhausted, as the processing of the lower grades is apt to damage the gin saws unduly. Cotton of the grade in process is emptied from the cultivator's sacks on to a large heap and is picked over by hand for the removal of extraneous material and damaged cotton. Then it is put into good-quality ginnery sacks and transported to the cotton store, when it is conveyed into the ginnery through a suction pipe. As the seed cotton is being fed by hand to the suction pipe, the further opportunity is taken to detect and remove defective cotton and extraneous matter. The conditions of cotton production are unpromising, but great and unremitting efforts are made to ensure that only good cotton plus trash as the cleaners can deal with, or is acceptable in the bale, goes into the ginnery, for in the ginnery the process is largely automatic.

Modernisation.—There are eight active ginneries in the Nuba Mountains and all have been rebuilt and re-equipped, or modernised, since 1954. Each has three or four ninety-saw gins working on the typical American plan, with pneumatic feed through Mitchell or Lummus cleaners, and pneumatic collection and transmission of the lint to the bale press. In one factory, at Talodi, the rate of feed is automatically controlled to maintain a uniform density of cotton roll in the gins; in the other factories the density of the cotton roll is assessed and the feed adjusted manually to produce the same result. Apart from this, the gins require little attention during running.

An automatic, or almost automatic, ginnery of the kind described demands very little labour to operate it and only moderate skill in that labour, but the machinery must be maintained in first-rate mechanical condition. The machines are well engineered to start with, and each year in the off-season they are thoroughly overhauled. During the season the supervising engineer visits each ginnery at approximately fortnightly intervals to check the work of the mechanic in charge and ensure that all is well and that mechanical deterioration is not developing.

The pattern of the ginning industry in the Buba Mountains has been developing over the past few years and this, together with the improvements in equipment, has doubtless resulted in improvements in the production of the lint. The pattern is now fairly well stabilised, but two further developments were discussed with the supervising engineer and are likely to take place.

The first concerns the addition of moisture before baling. This is done by a continuous fine spray playing on the lint as it leaves the condenser and enters the trampler. The amount of water added by the spray is adjustable, but at present this is done largely by guesswork. A study of the moisture content of the lint at various seasons of the year is contemplated, and as a result it is expected to develop instructions for a better control of the moisture added.

The second possible development concerns the provision of means for improving the "picking-over" of the seed cotton for the removal of defective cotton and extraneous matter. At present this is done unsystematically, the cotton being in a large heap. It should be possible to make the process more effective by passing the cotton before the examiners in a thin layer, perhaps on a moving lattice, and possibly with means for turning the cotton over as it moves from one lattice to a second, so that unwanted material is likely to appear at a surface where it can easily be seen.

(*The second part of this survey will appear in our September issue*)

Patterning Attachment for Tufted Carpets

With this new development the operation is entirely mechanical and it can be operated by the normal tufting mechanics. It is also stated that the design possibilities are theoretically infinite both warpways and weftways

By S. SHORROCK*

THREE years ago applications were made for a series of patents that would enable tufted carpets to be manufactured in a wide range of different patterns and forms. Patents have now been granted to Mohasco Industries Inc., New York, and they have concluded an agreement with British Tufting Machinery Ltd., whereby the British company will be able to manufacture patterning units employing this technique and fit them to nearly all models and makes of tufting machines.

The system of producing high and low loops is, basically, extremely simple. After the yarn leaves the usual guide tubes from the creel, it is taken through a new type of feed system. This consists of a series of pattern members mounted on endless chains. The pattern feed system consists of two sets of these members. One set is left at a constant height while the facing and meshing set is cut to the required depth of tuft. It is as though two meshing gear wheels are used to feed the yarn, one wheel having its teeth cut so that yarn passing between the two wheels is metered out to predetermined lengths.

The feed through the pattern members is shown in Figs. 1A and 1B. The yarn Y is fed into the feed system from the creel. It is taken in a zig-zag manner through the pattern members 1 and the constant members 2. With each tuft the pattern system moves forward a step and releases precisely the required amount of yarn for that particular tuft, less if it is to be short and more if it is to be a high loop. The yarn passes from the patterning feed system and through a guide 3. It then passes into a control zone consisting of two guide bars 4 between which rises a jerker bar 5. From here the pile yarn passes down to the needle of the tufting machine.

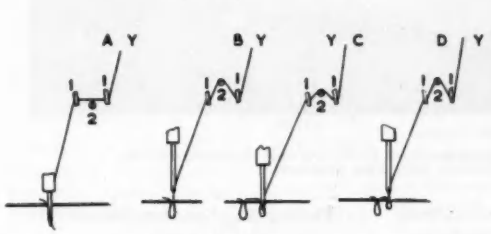


Fig. 2. Tufting sequence

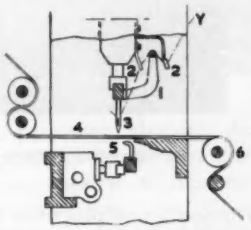
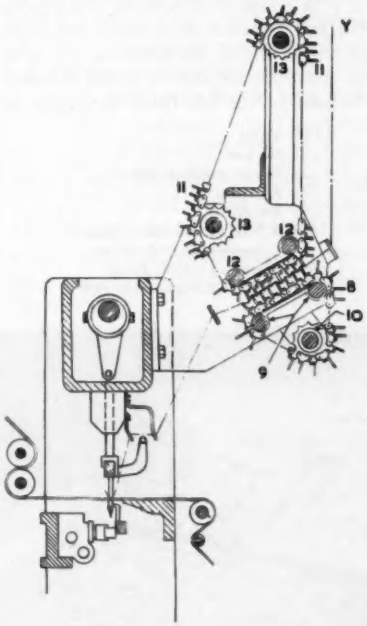
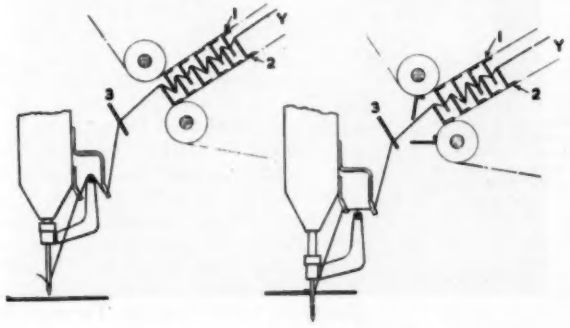


Fig. 3a. Action of jerker

Tufting Sequence

In Fig. 2, a tufting sequence is shown for a high and a low loop. The yarn Y comes from the patterning device down to the guide bars 1 and over the jerker bar 2. From here the yarn passes down to the needle. The needle passes into the backing and is 2A and withdraws to leave a loop as shown in 2B. This is a longer type of loop because there is sufficient yarn in the system to allow the loop to remain undisturbed. In 2C and 2D, however, a different situation appears.





(left) Figs. 1a and 1 b. Feed through pattern members

(right) Fig. 3 b. Monasco patterning system on a machine

(right) Fig. 4. Section of a bar

* *British Tufting Machinery Ltd.*

Broadloom tufting machine in an American mill equipped with the Mohasco patterning attachment

The needle now penetrates the backing but in this instance there is insufficient yarn in the system to allow a full length loop. As the needle withdraws 2D so the jerker bar rises between the twin guides and draws a proportion of the tufted yarn back from the loop.

The action of the jerker in relation to the twin guiders is always the same as it is coupled directly to the needle bar and the twin guiders are mounted on the frame of the machine. This is far more clearly shown in the detailed drawing in Fig. 3A. Here are shown:—

(Y) Yarn
(1) Jerker
(2) Twin guider bars
(3) Needle
(4) Backing
(5) B.T.M. rack-and-pinion looper mechanism
(6) Backing cloth feed
(7) Tufted carpet take-up

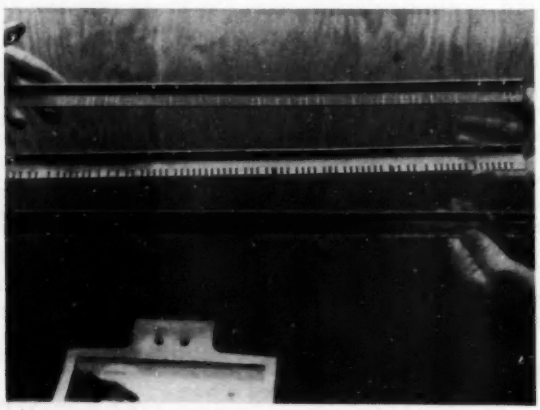
Patterning System Mounted

Fig. 3B shows the Mohasco patterning system mounted on a machine. The plain pattern members 8 are arranged in a relatively short circuit. These merely pass round a three-sided arrangement over idler pulleys 9 and then over a driven sprocket 10. This is coupled to the rest of the patterning system which is directly driven from the tufting machine and is fully synchronised with the tufting cycle.

The patterning section of the unit consists of the slotted patterning slats 11 which also pass over idler pulleys 12 and around driven sprockets 13. These can be adjusted to accommodate the length of the pattern chain which will vary according to the length of the repeat of the pattern in the final carpet. One pattern slat is required for each row of tufts in the carpet repeat.

The patterning system is based on the slotted slats running through the patterning unit. A section of such a bar or slat is shown in Fig. 4. A, B, C, D, E, F, G, H, I, J and K represent a series of lateral slots made into the bar. Each is of the same width and corresponds to one end of yarn passing into the machine. Each, however, is of a different height and so this will determine that the pile height of the yarns passing over the various sections will be released to the tufting machine in different lengths.

The height of the auxiliary bars in the patterning system is constant. Therefore the length of yarn in the actual system will be determined by the height of the pattern bar as shown in Fig. 4. If, as in A or K the bar is only slightly incised then the yarn will have to pass along a much longer path from the peak of the auxiliary bar preceding, over the pattern bar and to the leading auxiliary bar. This will mean that yarn sufficient for a relatively high loop will be released. If, on the other hand, the yarn passes over a deeply incised bar as in E then its path will be shortened and accordingly a short loop will be thrown. The pattern



Three bars showing from top: a marked bar ready for cutting: pattern bar after cutting, showing slots at intervals in the pattern and below is an auxiliary bar with comb-like teeth

Pattern bar production: marking off the pattern from the drawing on to a pattern bar

(right) Close-up of the attachment showing the drive system, yarn feed from the creel, into and through the unit and finally down to the needles of the tufting machine. Note the interesting lease-rod system between the pattern unit and the needles

(left) Pattern bar production: pattern bar mounted in jig on the horizontal milling machine which is used to insert slots into the bar

bar, as shown in Fig. 4, also indicates the arrangement for tufting two adjacent ends to the same height, these being B, C, G, H, and I, J.

The units are built to control the ends across 36 ins. of carpet in the tufting machine, so that a 15-ft. machine will have five such units running together across its full width. As each pattern bar or slat is slotted to accommodate the various ends of yarn going into the machine, it is obvious that it is essential to restrict patterning to a particular gauge. Should the same pattern be required for a different gauge machine a new set of pattern bars will have to be prepared to accommodate the different number of ends of yarn being fed through the machine. Similarly a separate set of auxiliary bars will also be required.

The design of patterned carpets is extremely simple. The repeat can, of course, be any length and any width, up to the full width of the machine, but it is unlikely that such huge repeats will be considered necessary or even desirable. The pattern is first drawn out to full size and then a series of blank slats are placed over the drawing, gradually being moved down as each row of tufts is marked out. The normal procedure of marking out is to coat the slats with a thin film and then place them, one at a time, across the drawing. Pile heights are then scratched directly on to the slat at intervals corresponding to ends of yarn. The slat is then ready for cutting.

Cutting the Slats

The cutting is a very simple process. An operative is provided with a simple milling machine, fitted with a special jig to hold the slat and feed it laterally across the wheel. When an incision has to be made the slat is pressed against the cutting wheel up to a stop that corresponds to the pile height required. Normally, of course, only two or three different pile heights will be required and accordingly the slats will be marked with the desired depth of cut. The cutter is a small horizontal milling machine that is easy to operate and inexpensive to maintain. The auxiliary bars are cut with a series of small grooves that really act as thread guides. They do not in any way control the patterning, although they are an essential and integral part of the whole system. Superficially these bars resemble a coarse comb.

It will be realised from this brief description that the Mohasco patterning system is simple and yet it gives complete control over every single end of yarn in the machine. The actual patterning limits, as far as pile height is concerned, are unlimited. Any variation in pile height can be obtained with the unit. One interesting aspect of this mechanical unit—no complicated electrical system is used in it—is that machines equipped with it in the U.S.A. have been found to run at even higher efficiencies than normal tufters not equipped with any pattern system. It would appear that the yarn feed through the unit is so kind to the actual yarn that it results in a reduced number of end breaks in the yarn at the needle.

Briefly summarised the advantages claimed for this system are:—

(1) The operation is entirely mechanical and does not involve the use of either electric circuits or pneumatics with their attendant maintenance problems. It can be operated by normal tufting mechanics.

(2) The design possibilities are theoretically infinite both warpways and weftways as compared with a system involving a pattern which gives a repeat of a fixed width across the carpet. With a pattern drum method a fault in one circuit is therefore repeated across the full width of the cloth.

(*continued on page 328*)

Pattern bar production: store for pattern bars. In each bin is a complete set of pattern bars for a particular pattern Auxiliary bars always remain the same, unless gauge is varied

Textile Institute Jubilee Conference

The papers given at this recent conference covered an unusually wide field, including fibre science, mathematics, management, clothing, employment, fashion and design. Summaries of some of the papers appear on this and succeeding pages

Twenty-Five Years of Man-Made Fibres

"IN view of the excellent properties of polyamides and the outstanding properties of the wool fibre, it is perhaps surprising that more effort has not gone into the synthesis of high-molecular-weight polypeptides," said Sir H. W. Melville, K.C.B. (Department of Scientific and Industrial Research). "In spite of a considerable amount of basic work on these polymers they have not been further developed. Synthesis of the monomer is, of course, not easy, and polymerisation conditions require more exacting control than is needed with some of the better developed synthetic fibres."

"Polyvinyl alcohol is an interesting polymer which can form fibres. Its big drawback is its solubility in water. Japanese chemists have worked for some time to overcome this disability by substituting some of the OH groups by other structures. There is still much scope for improving the methods of synthesising polymer(s) and of spinning the fibre. This may lead to a reduction in cost and of the possibility of new kinds of polymer structures being used for fibre forming materials."

"One recent development is that of interfacial polymerisation at room temperature or slightly above. The principle is that a hydrophobic liquid is floated on water and one reactant is dissolved in the aqueous phase and the other in the upper hydrophobic phase. These interact readily interfacially forming a skin of polymer. The most important matter is that a whole series of new kinds of polymers become available in addition to all the possible modifications of polyamides and polyesters that can be imagined.

Random copolymers, whether polyamides or polyesters, are easy to prepare, but block copolymers or even mechanical mixtures are out of the question because trans amidation or esterification occurs in the molten polymer when it is spun. With interfacial polymerisation this cannot occur."

"Six years ago a new type of catalyst was discovered which was powerful enough to polymerise ethylene at room temperature. The polyethylene so produced has a melting point about 10° above that of the product produced at high temperatures. These new catalysts were formed by Natta to polymerise α-olefines, in particular propylene. These products proved to be highly crystalline and they would form fibres on cold drawing giving tenacities as much as 10 grammes per denier. The important point about such products is that they are stereo-regular. This regularity of structure naturally makes it easier for the polymer molecules to line up and fit together into crystalline units. It is not surprising that such molecules readily form fibres. Intensive research led to the development of a great variety of catalysts of a similar type which will polymerise monomers like acrylonitrile, styrene, etc., to form stereo-regular polymers—lithium alkyls are notable in this respect. These polymers have a much higher melting point than the glass-like non-regular polymers. There is as yet insufficient information about the fibre-forming properties of such polymers. There is here great scope for much development."

"If new fibres are to make any headway they have to exhibit outstanding properties in one or more directions, but one—tenacity—has to be high, apart from all others. The outstanding fact is that although the chemical structure may vary, the maximum attainable strength is not very different. If tenacity depends upon interatomic forces or upon a great multiplicity of intermolecular bonds, such as would occur between closely aligned molecules, it seems likely that some increase could still be achieved with existing chemically similar materials."

T.I. Jubilee Conference

Psychology of Textiles

WHITE lace curtains at a window are a symbolic barrier, keeping the home "atmosphere" uncontaminated! This somewhat unusual view was expressed by Dr. Ernest Dichter, President of The Institute for Motivational Research Inc., New York.

Against the background of the basic psychological functions of all textiles, there were specific appeals which various types of fibre offered: for instance, cotton was pure, soft, friendly; silk was feminine, luxurious, intimate; wool, strong; the newer synthetic fibres were care-free, refined, sedate. Each fabric had its own appeals.

Wool had a strong masculine appeal and was a symbol of "respectable group life. Almost everyone thinks of English tweeds in a setting of old ivy-covered buildings — the English country squire, or the American college professor. Women tell us that cottons seem 'chaste' and 'innocent' 'fresh,' 'clean,' 'cool,' 'they give an appearance of inner calm' and 'unostentatious confidence,'" said Dr.

Dichter. The 'purity' appeal of cottons was enormously enhanced by the fact that women saw it as wonderfully easy-to-launder, to starch and iron, to keep clean.

Speaking of silk, Dr. Dichter said that this evoked images of "palaces of kings and queens and princesses, images of graceful oriental luxury. Of linen, he said: "There is a standard of excellence associated with linen. Much of this association has to do with the quality of the product itself. Linen is strong at the same time that it is soft and flexible."

Discussing the newer synthetic fibres, the speaker observed: "There are a number of areas in which the consumer has come to accept a synthetic textile as the natural one for the purpose it serves. For example, we find that nylon is completely acceptable for stockings and underwear although the same material is far less acceptable in outerwear clothing. This example is a significant one for it points to a psychological need that exists among most consumers: the need to maintain established values at the same time that progress is acknowledged and accepted. In the case of nylon undergarments, all the detail, the gossamer delicacy, the softness and beauty of silk is retained while ease of care becomes the extra dividend."

"This is the correct approach to the consumer, for what women really want is a synthesis between yesterday and tomorrow. They want textiles that are easy to care for but they also want to conserve time-honoured aesthetic values."

There was a need to re-examine the psychological climate in which textiles were created and marketed, in order to determine the proper appeals for increasing their acceptance and usage. Otherwise the time might come when the disposable paper garment, drapery, tablecloth and towel would win out over its textile counterpart.

"Millions of women sew today, using an almost unlimited range of textile products. But whether the consumer purchases her textiles ready-to-wear or by the yard, she lacks the direct and intimate knowledge of fabrics which once existed. This relative ignorance, coupled with the vast array of fabrics from which a selection may be made, creates in the consumer's mind a fear of selecting the wrong fabric or colour or pattern for her needs. *She is faced by a misery of choice which she is unable to resolve without the help of the textile industry.*"

T.I. Jubilee Conference

The Science of Clothing Hygiene: Past and Present

THE thermal transmission properties of textile fibres, whether natural or man-made, were not appreciably different, said Dr. E. T. Renbourn (War Office Clothing and Stores Experimental Establishment, Farnborough), and the warmth of a cloth, as first suggested by Bacon, was due in great part to the "confinement of air." Fabrics made of smooth fibres, or closely packed yarns, offered good surface contact and were better thermal conductors than materials with a hairy surface or an open texture.

Since water vapour was continuously being liberated by the body, its transmission through fabrics by diffusion was a property of some physiological importance. The rate of diffusion depended upon the relative volume of air interstices, fabric thickness and the physical nature of the fibre. Clothing ventilation was, however, a much more important method of removing the body's water vapour than the passive process of diffusion and, in hot weather, removal of sweat was the dominant requirement. Water absorbed into hydrophilic fibres was taken up not only physically but also chemically on to the polar groups of protein and cellulosic substances. Here lay still another factor concerned with warmth of a textile.

The ability of a material to take up water into its interstices, depended in part on the process of wicking, a process related to both the nature of the fibre and to weave geometry. Synthetic fibre materials, particularly if "texturised" or bulked, took up an appreciable quantity of water into the interstices and transferred it rapidly to the other face by their good wicking properties. Trials would, however, be required before they could be considered suitable as drip-dry underclothes or shirts in hot weather, for a continuously moist and overwarm skin predisposed to the sweat rash and to fungus infection.

The effect of impermeable layers next the skin on thermal insulation and of surface colour in the reflection of long infra-red radiation were also considered. Metallic films were also good reflectors of short infra-red radiation and aluminium foil (which did not tarnish) acted as an efficient reflector of both long infra-red and radar microwaves. Aluminised fabrics however, were not particularly good reflectors of body heat and, up to the present, had not been of great success (except perhaps, psychologically) in lining raincoats or lightweight cold-weather clothing.

Test Methods

During the last war a full-sized copper manikin was developed which could be dressed and had a surface temperature similar to that of human skin under comfortable conditions. Overall thermal insulation of a garment, or a combination of garments, could be measured on the manikin as a "clo" value, one "clo" being approximately the thermal insulation value of an average man's suit. Although expressed in the same physical units as the British "tog" value, the thermal insulation of shaped garments was clearly of a different order to that of a flat piece of cloth. The guarded hot plate and copper man gave reasonably consistent results, but how valid were they? The properties of a sample of cloth and of a series of garments were not fixed and immutable for they varied under the many physical and physiological conditions.

This section ended with the conclusion that accepted textile methods (of testing) "demonstrate that, although of functional screening value, and essential for inspection purposes, they throw but limited light on clothing as it is worn. In this matter I have been deliberately provocative, in the hope that the future of textile physiology will come from a closer collaboration of the textile physicist with the clothing physiologist, and in the development of dynamic functional techniques which simulate the body-clothing-environment complex".

Physiological Evaluation

In a temperate climate, said Dr. Renbourn, fashion was a predominant feature controlling our dress, and

hygienic considerations were perhaps, fortunately, of secondary importance. However, for the soldier or explorer, who often could not change into clean dry clothing or always sleep in a bed, functional clothing, for man-made hazards and climatic extremes, was of paramount importance. For this reason, research on clothing physiology had been more active on men, and in the military field.

At Farnborough three teams worked closely together in the evaluation of military clothing and equipment. One was concerned with serviceability under accelerated and normal use, another with garment physiology and functional laboratory tests, and the third consisted of applied physiologists collaborating with experimental psychologists. Most trails were of a comparative nature, the new versus the control (the standard item). One important factor was that the characteristics of a garment layer were dependent upon what lay above and below. Thus, the properties of a sock or a string vest depended upon the foot and boot, or the trunk and windproof cover; hence, the importance of assessing the physiological properties of garments as one inseparable system. Measurements of body temperature formed an integral part of clothing studies.

The subjective assessment of clothing was also discussed. Steps were taken to minimise bias, since soldiers are sometimes biased by the handle or design of a garment, and more concerned with its smartness and potential appeal to the opposite sex than with its more important functional qualities. To minimise these various factors, a comparative physiological study was made on a group of soldiers, using as experimental design some form of randomised block such as a latin square. Analysis of variance or covariance minimises difference between individuals as well as the effects of time — for instance, physiological acclimatisation to a garment microclimate or to the ambient environment. Mean differences, objective or subjective, could be tested by accepted techniques for statistical significance. One of the difficulties was the translation of experimental data into the operational realities of the soldier's life. A mean difference, even if highly significant statistically, might be of but little practical importance. In any case, statistical significance must be equated with economic factors and military logistics. For this reason, the best available quantitative methods were used, but the results examined with the cold qualitative eye of common sense.

T.I. Jubilee Conference

Employment Policy

"THE U.K. embarked at the end of the war on a policy which had as its aim what some people called 'full employment' " and the White Paper of 1944 on Employment Policy, "a high and stable level of employment," stated the Rt. Hon. Douglas P. T. Jay, M.P. This policy has been pursued by successive governments, with varying success, by two main methods: first, by the damping down or stoking up of total spending power, and, secondly, by attempts to steer it in directions where unemployed resources have appeared. Judged by the test of the simple unemployment percentage, the U.K. has been moderately successful in pursuing this aim, by comparison with this figure before 1939.

It may be said that the U.K. had a flying start in production during the immediate post-war years; but he doubts whether this can be seriously used to explain the faster progress of Germany, Italy and France over the last few years, since all were "independent sovereign countries with strong governments and reasonable political stability from 1949 onwards." If instead of volume of production, one takes either the volume of "domestic fixed capital formation," or the volume of exports, the picture is still the same. "Since 1953, U.K. exports of manufactures increased in value by 29% to the last quarter of 1959, but those of France by 98%, of Germany 168%, and of Japan 252%. The remarkable fact is that U.K. exports scarcely increased in volume between 1950 and 1958. As a result of this, the U.K. percentage share of the exports of manufactures has fallen since 1950 from 25·5% to 16·6%; Germany's has risen from 7·3 to 19·8%; France's has stayed about the same, and Japan's has risen from 3·4% to 7·1%. "There can be no serious doubt that if these tendencies continue, Britain's political and military, as well as economic strength, will decline relative not merely to that of Russia, but of Germany, France, Japan and even Italy."

Two possible reasons for the relative decline are the introduction of the European Common Market and the fact that in 1953 the U.K. was fully employed whereas Germany and Italy started with some unemployed manpower. The former cannot be the major explanation, because the E.C.M. tariff cuts had hardly come into force even in 1959. Even the unemployment figures cannot provide the whole explanation. "Unemployment in France has been negligible throughout the post-war period, certainly not higher than our own; and yet France has raised output by 70% over the last six or seven years, although the French employment figures increased by only 4%, almost the same as ours." Part of the answer must be that we are not nearly as fully employed as the figures suggest. "We are not employing now anything like our full resources, even though unemployment is again below 2%; the moral of this is that deflations do lasting harm, and that we must interpret employment policy in the future in a constructive sense, rather than simply in the sense of keeping the unemployment percentage down."

It seems probable that one reason for our difficulties is lack of investment. "We are still investing only 14% of our national production, as against 17% in the six Common Market countries, 20% in Germany and at least 20% in Russia. The main factor holding back investment in this country is uncertainty about the growth of future demand for the product. Production has been held back because demand has been deliberately restricted by Governments in the attempt to prevent rising prices and deficits in our balance of payments. We have allowed in the last few years an obsession with the word 'inflation' to blind us to the realities of the problem. If there were a choice between stable prices and stagnant production on the one hand, and slightly rising prices and production on the other, the latter would be preferable. It must be, because, without more production living standards cannot rise at all. Rising prices or unstable money values force one to face problems of distribution; but such problems can be solved with sufficient effort."

"If necessary we must take selective action to stop imports rising or keep prices down. The most important single example, I believe, is intelligent planning of the geographical location of industry and labour. This should be interpreted not as the Government bullying industries into going where they cannot manage their factories properly. It should be a partnership between Government and industry, which will help industry also by enabling firms to find districts which will suit them as effectively as the new employment will benefit the areas."

"In the light of the last fifteen years' experience we still have a long way to go in achieving full employment in a real sense. We are not yet fully using all the manpower available in many areas, or some of those workers who left industry during the 1957-9 years of stagnation; and we are still investing too little. We still have to be more specific and selective in seeing that activity is stimulated and checked in the right places and at the right moment, if we are going to achieve a really steady expansion, and at a rate comparable with that of our competitors. We must, I believe, take real and rapid expansion as our primary aim."

T.I. Jubilee Conference

Fundamentals of Fibre Research: A Physicist's story

THE first main topic discussed by Prof. Astbury, of Leeds University, was "that broad fundamental contribution of physics to our understanding of fibre structure on which rests the whole subject. It all seems childishly simple now, like so many great scientific advances in retrospect, but it should be judged within the circumstances that, in the twenties, it was not fully accepted even that cellulose was a chain-molecule, much less how it was put together to form fibres. It was X-ray analysis that gave form and three-dimensional reality to the chain-molecular concept and that first satisfying outlines of how fibres are constructed."

"It came to be established that the science of fibres is a principal division of the science of chain-molecules, and that fibres are to be described in the first place as 'molecular yarns.' The working-out of this formulation in detail has led to many long and difficult researches since. The parallelism with man-made textiles has now been found—I am still speaking of the biological world, it will be understood—not merely to include also molecular twist and counter-twist but to rise to fabulous heights of 'weaving' and similar constructional skills. My two standard illustrations of cunning biological fabrics, one vegetable and the other animal and both from quite lowly creatures, are the cell wall of the alga Valonia ventricosa and the cuticle of the earthworm. They are not 'weaves' in the usual textile sense but systems of lamellae made from submicroscopic fibrils running alternately in directions roughly at right angles to each other—'intermolecularly bonded fabrics' I suppose one might call them, laid down rather than woven, according to a specification that nature seems to have exploited exclusively."

"A thought that is insistent in contemplating man's textile successes in relation to wonder such as these is how very, very old it all is, as old as life itself. The true physico-chemical beginnings of life must surely have been when nature first discovered chain-molecules and their endless versatility, and likewise man, after previously learning to apply without knowing it similar principles in the manipulation of nature's visible fibres, now discovers them all over again, and very much more, at the fundamental molecular level and thereupon proceeds suddenly to race forward into an era of fibre research and development, and of plastics and rubbers in general, of a splendour that is one of the scientific and technological glories of our time."

"The next great advance in uncovering the shapes of fibre molecules brought to light the coiling and uncoiling of polypeptide chains and thereby explained the invaluable long-range elasticity of animal hairs and pointed the way to all subsequent work on the configurations of the proteins. Over the following twenty years much thought and many experiments were devoted to trying to elucidate the α-configuration. It was accepted that it was a regularly folded or coiled configuration which pulled out like a molecular spring into the almost fully extended β-configuration roughly twice as long, but it was not until the early 1950s that a convincing basis was found, largely at the now very well-known hands of Pauling and Corey. I say 'basis' because the answer is still far from complete even after all these years. What seems certain, though, is that the essence of the matter is in Pauling and Corey's famous 'α-helix.'

"During this last decade, the significance of the α-helix has grown to such an extent that it has come to occupy the position of one of the dominant architectural features of molecular biology. It has the property of possessing a constant core which is always a potential source of long-range elasticity, yet on the outside there may be distributed all sorts of sequences of side-chains as dictated by more specific requirements. Side by side with the long-drawn-out attack on these configurations there has proceeded a series of related attempts to decipher the molecular plan of the collagen group, the raw material not merely of the leather, glue and gelatine industries but also—infinitely more important in the end—of those age-old afflictions, the rheumatic diseases. Collagen has provided a very obstinate problem, and it was only a few years ago that its X-ray large-angle diagram—still the sole consistent specification of the collagen group—was at last interpreted, in essentials if not in detail."

Referring to man-made fibres, Professor Astbury noted that "everything textile originates in the biological fibres, and our inspiration for the future still lies there too, but I would not like to give the impression that the traffic of fibre knowledge is all one-way. The part played by man-made polypeptides in our understanding of those systems of native polypeptides that we call the proteins has grown more influential every day."

As for developments generally in man-made fibres, Professor Astbury stated: "the initial idea, for lack of knowledge (which we still lack) of how to synthesise cellulose and other polysaccharides, of 'refashioning' native cellulose structures by dissolving, re-precipitating, and further adapting them chemically, continues to find all its old applications and more, but, of course, the prouder achievement was in proceeding to synthesise fibre-forming polymers of our own—nylon 'Terylene,' acrylic fibres and the like. We have learned much new fibre science from them too, while yet being struck ever more forcibly how little we know compared with what is inscribed in 'nature's infinite book of secrecy'."

After discussing briefly the question of crystalline-amorphous relationships, Professor Astbury referred to electron-microscopy, noting that "it is not unfair to assess results obtained so far with the electron microscope on textile fibres proper as rather modest and scarcely more than a good beginning compared with recent revolutionary findings in other fields of micro-anatomy."

In conclusion, Professor Astbury remarked "chain-molecules are the clue to everything, and I can only repeat that the main road ahead for our science of fibres is still to be found, and will be found for many a long day, in trying to understand better the incredible things nature has done with them. The supreme illustration is obviously that of the nucleic acids. When Watson and Crick inferred that deoxyribonucleic acid (D.N.A.) is a two-strand helix in which certain nucleotides are always matched together, and it was shown to be so by X-rays, then was inaugurated with all its momentous consequences that science of 'molecular genetics.' We know now that the sequence of nucleotides in long chains of D.N.A. carries the ultimate code of instructions for biosynthesis, and what more could one ask of a fibre?"

New Publication

DECORATIVE ART 50: Studio Yearbook, 1960 - 61. Studio Books, 161 - 166 Fleet Street, London, E.C.4 (price 42s.).

This Golden Jubilee issue, edited by Terence Davis, contains the best in present-day design as revealed in the work of architects, designers and craftsmen of many countries. Altogether there are almost 500 illustrations (30 in full colour). The introduction, as usual, does not confine itself to the appreciation of modern trends and developments, but strikes a prophetic note, in this case, with its forecast of the layman's increasing dependence on experts in the fields of architecture and interior decoration. This introduction is, by the way, repeated in French, Spanish and German, as are also the preparatory notes to each section of the volume. Houses, apartments and furniture are described and illustrated in the opening section, followed by twenty pages devoted to textile fabrics, the notes to which draw attention to current use of fabric designs by Morris and other pioneers, both in Britain and on the Continent, enhanced and complemented by the inventive skill of the best modern designers. Carpet design, however, attracts some adverse criticism, chiefly on the grounds of lack of originality.

The remaining sections, dealing with tableware, light fittings, ceramics and metals, and glass are also well illustrated and capably annotated. The index of names of architects, designers and manufacturers whose work is illustrated forms quite a valuable directory of the world of international decorative art.

New Large Embroidery Field

Carl Zangs have made another important development in their automatic embroidery machines in that they now offer their six-head machine with an embroidery field of 10 by 7¾ ins., compared with the old field of 8 by 6 ins. In drawing attention to this Geoffrey E. Macpherson (Textile Engineers) Ltd., say that previously, firms who wished to do automatic embroidery of 10 by 7¾ ins. were compelled to buy a machine with only four sewing heads, so that this new development allows 50% production increase for the same embroidery field.

T.I. Jubilee Conference

The Worker and Science

"THERE can be no doubt that the application of science in industry can lead to a more abundant life, always provided that science leaves us alive to enjoy it," said Mr. Wright (Amalgamated Weavers' Association). "The important question is not so much one of whether or not science will play an increasingly important role in industry, but how speedily and how fully will it come?"

He went on: "Scientific developments have their impact on the worker. The discovery of synthetic fibres had little immediate impact upon the weaver. The same machinery was used. But the introduction of the automatic loom had an immediate impact. The same can be said of automatic winding frames. A mixed labour force precludes an alternating three-shift system, and male workers tend to become permanent night workers." The timing of developments is a matter of concern. As the 1956 T.U.C. Report said, "Unions would like to see automation introduced at a pace that is not so fast as to put a breaking strain on the industrial relations machinery and not so slow as to jeopardise industries' competitive efficiency, and thereby threaten employment." Mr. Wright notes that the word "science" could equally well have been used.

If innovations are to be successfully carried out, a sound communications system is essential. "Those involved should know as much about the suggested changes and the reasons for them as it is possible to impart." "If the needs and problems of the workers concerned were considered initially as an integral and necessary part of the operation, much frustration could be avoided."

One of the problems that follows industrial scientific progress is that of redundancy. The worker cannot always expect to keep the same sort of job at the same undertaking. "His machine may become obsolete or his craft die because of a changing pattern of demand. But he expects a job of some sort, and he will prefer to keep the job he has had for years. He will do all he can, science or no science, to prevent circumstances arising to put him out of work. To accept unemployment as a necessary corollary to change is to offend against moral responsibility, and in the long run mitigates against progress." Nevertheless, there is almost bound to be at least some marginal unemployment. A deeper social consciousness about this problem is now developing. The payment of compensation in respect of loss of employment as a result of the closing down of mills under the Cotton Industry Act represents the first industrial agreement within private industry to make such provisions.

Cash payments are an important part of redundancy schemes, "but the examination of transfer possibilities, re-training, and so on, is equally important. Most workers would prefer to be transferred or trained in another job rather than become unemployed with a few weeks' wages in their pockets." If resistance to change is to be overcome, more attention will need to be given to the problem.

"The advent of new techniques in industry has created difficulties for the older workers and for the undertakings employing them; it is in the social and economic interests of employers and society as a whole to make the fullest use possible of the experience and capabilities of older workers in a period of rapid technological development and industrial expansion." The problem is bound to grow as technology develops, and will demand close attention by industry, with the re-training, where possible, of older workers, of their transfer to more suitable jobs."

"An encouraging feature of the growing realisation of the workers' part in scientific progress is the developing interest in ergonomics. There is a tendency to think of conditions of work as meaning only wages and hours, but ergonomics deals literally with conditions of work. It means machines and workplaces designed and laid out in accordance with operators' limitations and capacities, as illustrated by scientific research. It can make a valuable contribution to health and safety, and can also make for greater efficiency and higher earnings."

"The purpose of scientific research is, or ought to be, to make life more abundant for mankind. It is because we see the danger of the scientific attack ending in confusion, if the timing of the different movements are not adequately supervised, that the workers and their leaders look a little askance at scientific trends. That is why we believe that the different movements must be clearly understood. For science to run ahead of our knowledge of human relationships could spell disaster. For the machine to become perfected at the expense of man would be wrong. But if scientific and technical efficiency can run hand in hand with human dignity, swift and real progress can be made. The workers stand to gain much, but only if we believe that science is for man and not man for science."

T.I. Jubilee Conference

The Designer

"THE training of the designer is important," said Prof. Roger Nicholson (Royal College of Art). "It must itself be linked with the conditions which cause his own personal instinctive re-assessments and re-valuations. It must enlarge him in his training and fill, in his imagination, the universal experience of which we are now part and yet shrink the world to become within his grasp. Initially he is taught to look around him, to see new values of colour, line and arrangement in his surroundings. He is taught to draw and to design, to analyse and to impose his own ideas upon what he sees, and is taught to understand the quantities and uses of colour. His training extends to an appreciation and use of many more values than these and a great deal of his development comes from his associations with experiences received from the world and from his use of materials and the values created by their use."

After his training he must be given opportunity to work with freedom. "He does well as a vital part of a developing idea and miserably as part of a repetitive life which asks of him only an average of his ideas and which, in his case, should be only a part of his existence. His difficulty is to step from the isolation of his training—a period of study and of personal development—into the open field of industry. This is a real difficulty and often ends in failure. He has much to offer—is full of new untried plans and comes face to face with the cold reality of obstacles and difficulties beyond his experience. In this I think, help is needed. His training should help to overcome this. Part of a designer's training should attend to this problem of industrial interpretation of ideas; and I believe that for him to enter industry as an automatic answer to a repetitive problem is not ultimately of any use to anyone, and leads inevitably to a slow death or stagnation of both."

In the immediate past, the British public responded very strongly to function, durability, and efficiency. "It is increasingly necessary now to reject any particular loyalty to any phase of design and instead to become happily and loosely part of a rollicking, rolling, topsy-turvy movement to which there is never any answer or finality. Beneath it, however, must be firm principles and standards to find occasionally, in each new phase, those few original combinations which become museum pieces of a design art."

Looking to the future, Professor Nicholson said: "I see an industry which itself is tremendously varied and complicated. It deals with different subjects, it has different personalities. It has different capabilities. I see an endless market—markets to come which have not even yet been thought of. I see designers, who themselves will become part of this idea, or who could become part of this idea if put in the right condition, to develop within the idea. And I see the whole thing as something forever in movement to which there will never be any one answer. It is too obscure and too varied for that which is right for one to become the answer for all."

Unfortunately, in the field of design Britain follows where it ought to lead. One way to overcome this "is to institute a style as a conception in the first place and to develop it to become characteristic of (*a*) house, and this becomes an answer to a

personal intuition of demand and not to the tendencies in a sales book. Generally, this is especially successful because the designer is controlled, and this means a double job of control for someone with dual powers of direction. The results of this sympathetic control and leadership over designers are interesting to study. To give greater powers to the designer himself would be to run the risk of impulse and over-enthusiasm in contrast to necessary hard-headed business faculties."

"In our industries that depend finally upon the appeal of their product in artistic and fashion terms, I think there is a missing man. He is the essential link between the intuitive originator of the idea, the ultimately discerning public, the buyer who selected it as being the public's choice, and the producer who decided what to turn out. I see the man who is a link being ultimately he who covers the deficiencies of us all. All the qualifications necessary in this person are unlikely to be naturally present at the beginning, and it will be vital that some idea of his training should concern us all. The qualifications should obviously contain a knowledge of artists and their ideas, a familiarity and ease in working with them, in leading as well as being led by them (a subtle game); a knowledge of the world, its tastes and requirements and an intimate understanding of its many divisions and vicissitudes; a good business head, and a knowledge of and an appreciation of associative developments in related fields of design."

The person should be "a leader, a stylist, knowing well the present, certain of the future, to decide without unreasonable gamble, a man of ideas. From him, I can see a greater fluency amongst us, quicker answers, better results, perhaps more divisions, perhaps an enlightenment of buyer, a public who would enter more interestedly into the game and an eventual establishment of a new British quality—that of setting the pace, of being the pioneer of styles, the real trunk of the tree, from which the branches draw the sap of life and survival."

T.I. Jubilee Conference

Management in the Second Industrial Revolution

"THIS Conference has brought together, under one Institute and theme, a variety of specialists and yet it is, perhaps, only today that speakers must concern themselves with the common factor among all speakers, in particular the integration of science, technology, and sociology into plain management," said Sir Walter Puckey. "Putting our task into simple terms, it is how to put to work in the right proportion all these valuable, fascinating specialisations for the overall good of industry."

Sir Walter "used the term Second Industrial Revolution to emphasise the achievements of today, and the challenge and possibilities of tomorrow. The First Industrial Revolution introduced the machine which for decades dominated man. We are approaching an era where man will dominate the machine. In addition to the greater importance of men in a machine age, there was also a rapid rate of change in the materials and machines themselves and no manager can call himself modern unless he holds these two forces in his hands and achieves balanced control over them."

Sir Walter then discussed the contribution of (*a*) machine sciences, (*b*) social sciences and (*c*) managers to management. The first of these factors he discussed under three headings: (*a*) the pressure of scientific and technological development, (*b*) the demand for quality and (*c*) the advance of automation. Technological development is playing an important part in increasing diversification which may well lead to difficulties. "A company should consider very carefully before it takes over a wider range of specialist activities. It is becoming difficult, managerially, to integrate uncommon specialists, and if you increase the number of different specialists in the Company, in turn you decrease the number of senior managers who have the ability to control this wider group." There is even greater opportunity for developing existing products as the speaker points out, "this may not be as spectacular as buying a new invention, but it certainly pays the rent."

"Automation is as much as managerial philosophy as a technical exercise. If considered broadly it involves the extension of mechanisation into brain or control machines as well as muscle saving machines. This central feature of automation, the extended development of machines to control other machines, is important to a manager. It means that he can now delegate more things to machines as well as to other managers or men." Moreover, remote control becomes possible. However, there is the danger that centralised statistical control will encourage more centralised machines and managerial power.

"How many managers in the textile industry," asks Sir Walter, "are actively using the tools currently provided by such specialists as psychologists, neurologists, mathematicians, ergonometricians, cybernetics and sociologists? Just as the machine sciences are giving us new materials, machines and processes, so the social sciences are now uncovering knowledge vital to the better management of men and incidentally, a better understanding between men and the machines they use."

Three of the main responsibilities of a manager are those for maintaining (*a*) technological strength, (*b*) organisational strength and (*c*) managerial succession. In these fields, Sir Walter believes that managers have much progress to make. "We must ensure that more better-trained men are coming in at the lower end—men who know enough about the theories of the back rooms on research, but are able to see the value of applying this research more quickly to the front rooms of industry. We must study and practise good organisation more intensively, because the diversification policies, the widening production range and the growing reliance upon specialists will force us to unite these uncommon activities into a common outlook and objective. We must see too, that managerial strength is not only maintained but increased to meet the greater demands of the Second Industrial Revolution. Better training, better recruits, better selection, all play their part."

T.I. Jubilee Conference

A Retrospect of Mathematics in Textile Technology

"THE most common, and almost instinctive, use of mathematics is in the analysis and presentation of the results of experiments," said Mr. L. H. C. Tippett, M.Sc., F.T.I. (Shirley Institute). "In all such uses, the mathematics or statistics is a tool, occupying a very subordinate position in the mind of the investigator and in the paper presenting his results. Often, however, a theory is developed from the results, and then mathematical analysis plays a more important, and sometimes predominating, part."

The speaker discussed briefly many textile applications of mathematics, particular emphasis being placed on yarn mechanics and the irregularity of slivers, rovings and yarns. After enumerating theories advanced to describe the mechanical behaviour of yarns in terms of that of fibres, Mr. Tippett continued: "Perhaps we may pause briefly to consider how far the ideas behind the cloth and yarn engineering have been realised and what has been the achievement. It is my impression that the textile designer is still very far indeed from being in the position of the mechanical engineering designer and that he still must rely largely on empirical data. However, there are glimmerings that the effects of some factors can be predicted from theory in a useful way, and theory is

(*continued on page* 309)

Noise Control in Textile Plants Raises Machine and Operative Efficiencies

Effective noise control is an important science and some details are given of the American Standards Association method in which safe loudness ranges at various frequencies have been determined

By P. W. SHERWOOD

CONTROL of plant noise can have an important effect on any company's profits. Progressive management of textile plants are realising that industrial noise ranks with air pollution as a major industrial hazard. It is estimated that loss of working efficiency, including absenteeism, due to excessive industrial noise is costing American business 4 - 5 million dollars/day. More concrete evidence are the claims for occupational hearing loss which, in the United States, exceed two billion dollars/year.

Almost as important is the effect of industrial noise on community relations. At present, most communities exert their control over industrial noise in terms of general zoning restrictions (e.g., "no heavy industry"). Beyond that, progressive management desires to avoid the displeasure of the community, and the hazard of court action by individual citizens acts as a spur to effective noise control.

A move toward more effective legal control of industrial noise is now underway, as numerous communities are studying the adoption of new zoning regulations which specify the maximum sound pressures permitted at specified points and at various times of the day. Despite its importance, the science of industrial noise control is still in its infancy. Yet, enough is already known to permit effective action in power generating stations. Confining our attention to the major problem of avoiding noise damage to the company's own employees, the overall approach takes two courses: (*a*) means to reduce generation and transmission noise: and (*b*) establishment of a medical control system concerned principally with workers' hearing.

Effect of Noise Level on Human Health

Measurement of noise is directed at two primary components:—

(1) Intensity of loudness which is measurable in terms of the physical pressure exerted by the sound waves on the microphone—or on the ear drum. The measurement is commonly expressed in terms of decibel, a pressure scale which is so chosen that zero decibels represents the weakest sound which can be heard by a person of good hearing. Fig. 1 represents intensity of typical noise sources.

(2) Frequency is a measure of the pitch of a sound. It is expressed in terms of cycles per second. Normal industrial noise is a composite of many frequencies. The intensity of the various component sound frequencies differs—and so does their effect on human health. The distribution of intensity as a function of frequency in a particular noise determines the quality or timbre of the sound.

Fig. 1. Overall sound levels are measured by a sound-level meter (levels below 85 db are weighted levels). Sound-level measurements give only part of the information usually necessary to handle noise problems and are often supplemented by analyses of the spectra and even by oscillographic studies (courtesy, General Radio Co.)

While the foregoing primary components are the most thoroughly explored, a number of other characteristics of a particular noise have significant effect on worker comfort and health. Included are total length of exposure, continuous or discontinuous character of the sound, length of interruptions, medical history and age of employee. For example, recent research has shown that "time on" and "time off" have a very significant effect on the threshold intensity of which temporary loss of hearing occurs, but quantitative information in this area is still fragmentary.

From a medical point of view, the chief harmful effect of most types of industrial noise is temporary or permanent loss of hearing. For legal purposes, "permanent" loss of hearing usually implies that full hearing power is not recovered within six months in a changed environment.

Up to a sound intensity of 120 decibels (db), no physiological effect other than loss of hearing has been clearly demonstrated but research sponsored by California's Subcommittee on Noise is now evaluating the effect of certain types of noise on motor activity, on the autonomic (i.e., involuntary) parts of the nervous

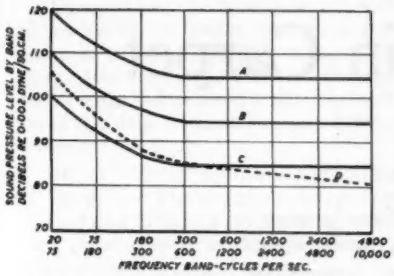


Fig. 2. (A) Serious risk. (B) Wide band noise. (C) Negligible risk. (D) Pure tone

system and on temperamental behaviour. From the efficiency point of view, it has been demonstrated that noise levels above 45 decibels interfere with adequate conversation, while prolonged exposure to noises above 80 decibels clearly causes fatigue symptoms.

At very much higher sound levels, more serious symptoms are encountered. Temporary deafness is observed in the range of 100 db. Above 140 db, damage to humans occurs almost universally. Exposure to 150 db causes severe (but often only temporary) hearing loss; vibration of cranial bones and an apparent weakening of the muscular structure are observed, and blurred vision occurs when the sound is at frequencies between 700 and 1,500 cps (cycles per second).

Based on statistical studies, the American Standards Association has determined safe loudness ranges at various frequencies. The correlation is shown in Fig. 2, which can serve as a rough guide to choosing design limits for noise control. For most noises encountered in textile plant experience, the curve labelled "wide band noise" is the applicable limit. For occasional sounds whose frequency range is fairly narrow, the "pure tone" curve applies.

In increasing measure, the problem of industrial noise control is becoming a matter of concern to governmental agencies. The Committee of Consultants to the N.Y. State Workmen's Compensation Board offers the following criteria:—

(1) **"Most persons exposed for several hours daily to noises at intensity levels above 120 decibels, whatever the 'composition' of the noise, will in a matter of months suffer permanent damage to hearing;**

(2) **"Most industrial noises at 'overall' levels of 100 to 120 decibels exposure for several hours daily for a long period of time will cause permanent damage to hearing in a considerable proportion of persons, the proportion being higher the more closely the noise approaches the intensity level of 120 decibels and the more the noise is dominated by high pitched components;**

(3) **"The hearing of a few very susceptible persons may be permanently damaged by exposure for many years to certain noises at levels between 90 and 100 decibels. All decibel levels mentioned are based on the standard reference level of 0·0002 dyne per square centimeter."**

Standards limiting the permissible noise in a given frequency range are being established by numerous countries. For example, the following mandatory limits have been established in the U.S.S.R. for non-percussive industrial noises:—

Frequency Range (cps)	Intensity Limit (decibels)
60 - 350	90 - 100
350 - 800	85 - 90
800 - 12,500	75 - 85

Individual workers whose hearing is becoming impaired despite these noise limits must be transferred to other occupations. Similarly, Japan has proposed noise limitations designed to prevent hearing loss in excess of 25 decibels in the speech range after 20 years of service. The standards are 95 db at 100 - 200 cps, 90 db at 200 - 3,200 cps, 85 db at 3,200 - 6,400 cps.

These limits are fairly close to standards normally applied in the U.S., which may be summarised as follows (for wide-band noise).

Frequency (cps)	Negligible Damage Risk Level (db)
20 - 75	100
75 - 600	92 - 85
600 - 10,000	85

The foregoing data are derived from statistical studies. They do not necessarily protect all individual workers exposed to the noise. To protect against damage claims from workers who are unusually prone to the effect of noise, as well as to avoid unjustified claims, it is recommended that the plant population's hearing ability be monitored under a regular programme. Such a programme must include pre-employment audiometric tests. Furthermore, periodic audiometric tests should be given to employees to check susceptibility to hearing loss. If significant hearing loss appears to be imminent, the employee should be relocated in less noisy environment.

However, none of these steps can take the place of a concerted programme to reduce the noise level in the plant well below the tolerance limits. Ways in which such a programme may be carried out in power plants will be discussed in a subsequent article.

A Retrospect of Mathematics

(*continued from page 307*)

apparently proving to be useful in providing a basis for the systematisation of empirical data. Whether it will ever be possible to reduce the complexities of textile structures to completely mathematical form remains to be seen."

In the discussion on irregularity, the speaker outlined the drafting theories of Hannah, Cox, Foster, Grishin, Grosberg and Burnett. Commenting on the application of these theories, the speaker noted: "The limited objective of Miss Hannah's theoretical work on drafting has had practical application in helping to decide some of the particulars of the Ambler high-draft system, but it is hard to see that the remaining considerable body of work has advanced technology appreciably, except that the general approach underlying Foster's work on drafting gave him an understanding of the very practical problem of roller-slip at the drawframe of the cotton system. The theories are still under trial, and practical results are used largely to test them rather than the theories being used to predict practical results. The approaches of the different workers are varied and perhaps the most useful next step would be some attempt at a critical selection from among the assumptions and postulates, and at unification."

In conclusion, Mr. Tippett said: "In application of mathematics to technology some theoretical description of the system under study, or 'model,' is postulated, and the mathematics is used to work out quantitatively the properties of the model. The model is often derived almost from first principles, with little more than a superficial technological knowledge being involved, and the main weight of the work is in the mathematical development. For the technologist, the obtaining of a mathematical solution is not the end of the story even when, as by no means always happens, the equations have been evaluated numerically or graphically. Application of the results requires an understanding of the model, particularly of its limitations, and of the real-life technical situation. A mathematical solution alone is not enough, there must also be a picture in the mind of the technologist."

"In summing up the achievements of mathematics in textile technology, I would say that they have been essential to progress, but unspectacular. Seldom, if ever, has mathematical analysis led to results that were not previously known through empirical investigation. Very few mathematically based calculations have so far provided a sufficient guide to design or action. This is partly because most textile systems are too complicated to be completely described by such models as mathematicians at present can handle, and partly (perhaps) because empirical investigation has been going on very extensively and for a long time. I think that the main achievement of mathematics in textile technology has been in guiding experimentation, and in helping towards an understanding of what is happening by sorting out the main factors at work and making it possible to assess their importance."

Some Common Faults in Carpet Manufacturing

Suggestions for improvements fall chiefly into four groups: (a) careful selection of basic materials, (b) adoption or improvement of quality control methods, (c) more efficient supervision and (d) planned maintenance, including stop devices where possible

By T. R. BRIDGFORD[1], D. R. MILLS[2] and D. R. SMITH[3]

ALTHOUGH by no means an exhaustive survey of all fabric faults arising in carpet manufacture, this article is intended to provide a reasonable picture of this serious problem. Faults in weaving and preparation are the cause of a large amount of waste, both material and productive.

A thorough knowledge of the main fabric faults, with regard to recognition and causes, is the first step towards reducing them, and it is with this in mind that this article sets out to discuss the various faults. Some suggestions for the reduction of such faults are included as a separate section. The three main types of traditional carpets shown in Fig. 1 are Wilton, Gripper Axminster, and Spool Axminster, and these account for roughly 90% of the production in the United Kingdom. It is these three types which are discussed in the article.

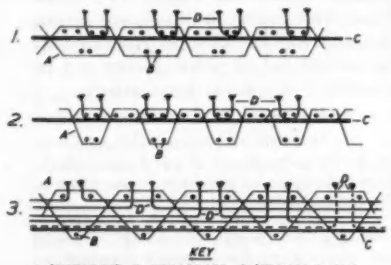


Fig. 1

1. Medium Quality Spool Axminster.
   7 pitch, 6½ rows/in. } 45½ tufts/sq. in.
   1/14 lb./spindle jute weft.
   3/9 cotton warp, 2/55 yd./oz. (55 S.E.). Pile 12/16 in. tuft length.
2. Medium Quality Gripper Axminster.
   7 pitch, 6½ rows/in. } 44 tufts/sq. in.
   2/7½ lb./spindle jute weft, 3/9 cotton warp, 2/50 yd./oz. (50 S.E.). Pile ⅜ in. tuft length.
3. Fine Quality Wilton.
   256 pitch = (9½ axminster pitch, 12 rows/in.) } 114 tufts sq. in.
   5 frames, 2/11 leas linen weft, 3/9 cotton warp, 2/2/9 worsted pile, 10/32 in. wire height.

(1) *Carpet Trades Ltd., Kidderminster.*
(2) *Brintons Ltd., Kidderminster.*
(3) *Textile Dept., College of Further Education, Kidderminster.*

Wilton

Faulty Selvedges.—(1) small loops protruding from the selvedge, (2) selvedge pulled in.

Cause: The weft tension in (1) is insufficient and in (2) too great because the shuttle tensioning device (trap) is incorrectly set. Variations, either of a long or of a short term nature, in yarn thickness may also effect the tension. Missing or insufficiently tensioned leisure threads can also cause faulty selvedges.

Weft "Chopping".—This is a term which is self explanatory. Small portions of a row of pile are seen to be missing.

Cause: The pile binding weft is broken in places by excessive beat-up at that point, due to uneven backing or pile warp tension which allows certain parts of the "fell" line of the cloth to lie nearer to the sley than other parts.

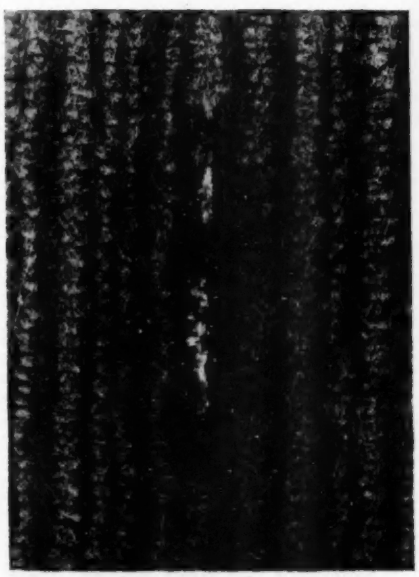
Broken Weft.—A blank pick shows up as a line across the width at the back of the carpet if the back weft is missing. If a top weft shot is missed in a 3-shot weave, then the tufts would not be bound as firmly and this would show as an uneven row of pile across the width. These faults may occur as a whole or part of a shot.

Causes: (1) The weaver may have had cause to unweave, and started weaving with the wrong shed formed. This would be more probable for a missing back shot.

(2) The weft may have broken and the tail of yarn have been quickly caught up in the changing warp shed allowing weaving to continue.

Broken Chain Ends.—If both chain ends in a dent are missing, this will be clearly seen as a double space in the evenly spaced chain threads running down the length of the carpet. A single end missing fails to weave with alternate back shots, and although this imperfection can be seen, it would not be as apparent as the first fault.

J



K

Fig. 2. J-K missing tufts causing backing to show

Broken Stuffer End.—Tends to show up on the back as for broken chain ends, but is not so apparent as it does not interlace with the bottom weft but lies straight above it.

Cause: If excessive—low quality or badly prepared yarn giving slip or large knots.

Missing Pile Tufts.—Missing tufts (see Fig. 2) periodically or in a continuous line down the length of the carpet, depending upon the design. On face-to-face looms this can be serious if effective pile warp stop devices are not fitted.

Cause: Creel bobbins running out; if an excess of broken ends occurs it may be caused by inferior material or large and slip knots. Pile yarn may be held down below the pile wire through entanglement with an excess of loose fibre.

Wrong Pile Colour Selection ("*specks*").—The wrong colour appears in isolated tufts or a small line of tufts, and possibly more markedly as a longer line down the carpet.

Cause: Faulty jacquard card stamping may cause the wrong colour or more than one colour to be selected. A fault or breakage in the jacquard needle assembly could cause a line of the wrong "frame" (colour) to be made down the length of the carpet.

Missing Single Yarn in Folded Pile Yarn ("*half ends*").—Tends to show in isolated tufts or as a complete or broken line down the length of carpet depending upon the design. This is more apparent in low qualities.

Cause: This may be due to faulty twisting, in which case there is a complete absence of the missing single, but if the breakage occurs on the loom, then the broken single thread may hang from, or be pushed along, the remaining yarn during weaving.

Knots

Description.—Knots which are woven into the carpet can show up in the finished fabric. These have to be removed and replaced by a normal tuft. Knots can also cause missing pile ends, due to their being broken out during weaving.

Slack Stuffer Threads.—The carpet appears distorted or "baggy."

Cause: Uneven beaming tensions in sections of the warp sheet or uneven rate of let off where more than one stuffer beam is used in the width of the loom.

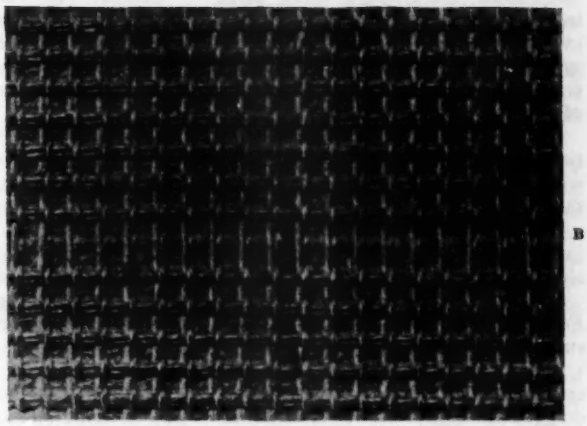
Wire Marks.—A line of irregular pile surface shows across the width.

Cause: Irregular blade surface.

Gripper Axminster

Broken Weft.—A missing top weft would show as an uneven row of insufficiently bound pile. A missing back weft would appear as a distinct line across the width at the back of the carpet since a "rib" would be missing. These faults could occur as whole or part shots.

Cause: (1) The weaver may not have started weaving with the correct shed formed after repairing a break or unweaving. This would be more probable for a missing back shot.



A B

Fig. 3. A - B. Gripper axminster weave. Bottom or back shot missing

(2) The weft may have broken without being detected, and then have been quickly woven in again.

Chain and Stuffer Threads Breaking Out

Bottom Chain.—The evenly spaced bottom chain threads would have double spacing showing on the back of the carpet where the thread is missing.

Top Chain.—Although the thread is missing this omission does not show clearly on the back of the carpet.

Stuffer.—As for top chain.

Causes: (1) If excessive—low quality or badly prepared yarn, giving slip or large knots.

(2) Chafing by shafts.

(3) Cutting out by reeds, which are not aligned properly or have sharp edges.

(4) Very occasionally the knife fails to cut pile thread at one carrier, and a length of yarn is pulled down to the carpet. Subsequently it may be cut away from the carrier and be entangled with chain threads causing breakages.

(5) Thick jute weft can displace chain threads from their correct comb space causing them to be chopped at subsequent beats-up.

(6) Excessive warp tension through faulty let off.

&roken Selvedge Threads (*leisure*).—Distorted edge on the needle side of the carpet since the normal warp threads are insufficiently tensioned to withstand the drag of the inserted weft. On the shuttle side, a loop is formed at the end of each shot by the weft holding needle which passes through the double stranded weft shot near the shuttle selvedge.

Wrongly Tensioned Selvedge Threads.—An insufficiently tensioned selvedge thread at the needle or shuttle side of the carpet can also cause these faults, a variation in tension can also give rise to carpet distortions so that a length will tend to curve when laid flat.

Cause: Selvedge threads may have broken due to excessive tension or weakness due to the thread being of insufficient thickness or quality. Variation in tension may be introduced if the shuttle package is not wound correctly and similarly if the selvedge threads fed in through the heddle shafts are not prepared efficiently. Faulty threading through the shuttle side can also affect tension.

Missing Pile Tufts.—A gap or a line of gaps shown in the pile depending upon the design. The gap width is that of a single tuft which should be formed from a single creel bobbin. Adjacent tufts could occasionally be missing on the same row of pile, depending upon the design, and thus widening the gap.

Causes: (1) Weakness in the yarn or a knot failing to pass smoothly through the carrier.

(2) The Gripper may also fail to close on the yarn if it is not positioned correctly; a thin yarn or one having turns per inch which are other than standard can affect the positioning of the yarn which protrudes from the carrier.

(3) Creel bobbins which have run out; this occurs more frequently when a set amount of dyed yarn is being used up on the creel.

Odd Bobbins.—Bobbins of the wrong shade are wrongly put in the creel with the correct shade.

Cause: Nearness of shade makes differentiation difficult in winding or at the loom, although there is no excuse for this occurring if normal care is taken in keeping yarn lots separate.

Unfolding ("*Splitting*") *of Yarn.*—The gripper takes a single end of a

two folded yarn giving a "thin" place in the body of the pile; this can eventually lead to missing tufts as the gripper fails to close on the protruding single yarn which is often knocked out of alignment.

Causes: (1) Variation in twist giving rise to low turns per inch or a twist which is consistently too low causing the yarn to unfold.

(2) Faulty threading through the carriers by the creeler or weaver may also give "split" yarn.

Two Ends in One Carrier ("*Rising Ends*".)—Two tufts are woven in stead of one.

Cause: Faulty threading by the creeler or a second thread being dragged through a carrier after it has fallen from its own carrier. Crossed ends between carrier and guide bars can increase the frequency of the latter fault since frictional contact is greater when the threads are not able to follow their own separate course.

Selection of One Colour Across the Full Width of the Carpet (*heavy lashes*).—A "frame" of yarn, usually the ground colour, is selected instead of the combination of colours for which the card is stamped.

Causes: (1) Wide fluctuations in relative humidity cause the card to distort and fail to fit correctly over the positioning nipples on the card cylinder; consequently if all the needles are pressed then one colour is selected across the full width. Some jacquards give a selection when the needle is pushed and others when the needle passes through a hole in the card (Verdol), and the latter type of card appears to be more prone to distortion.

(2) Slack card lacing can also give a bad fitting of the card on to the nipples.

Specking.—Odd tufts of the wrong colour appear.

Cause: Faulty jacquard selection due to damaged jacquard needles, damaged cards, faulty lacing, oily lifters. "Broken pegs" and cards distorted by humidity variation have been discussed fully and in addition to the more marked defects described they can cause this less severe fault.

Patterns "Running Out."—Two widths of carpet, laid side by side, do not match exactly, and the failure to match becomes progressively worse along the roll.

Cause: Very slight variations in rows per inch due to lack of precise control of take up at the loom, or variation in tension at the loom.

Unlevel Pile.—A generally rough and untidy appearance is given to the pile surface.

Causes: (1) The carriage moves away from the grippers or vice versa to form the tuft length, and then the knife travels across the stationary saw tooth blade to cut away the tufts. Incorrect timing of the tuft "pull off" and the cutting action of the knife over the blade could cause drag on some of the pile as the cutting takes place and also a gradual lengthening of the tuft across the width in the direction of the cutting action.

(2) A worn knife cutting edge would tend to drag the pile threads tending to cause a rough surface.

(3) Broken teeth in the saw tooth blade would cause drag on the pile threads as cutting occurs.

(4) Timing of the grippers opening and closing.

Gripper Mark.—Longitudinal marks due to rough and unlevel tufts being formed in a dent.

Cause: Loose or tight grippers and badly fitting rivets in the gripper.

Pegs Bent or Broken.—One colour in the carrier appears too frequently in the carpet tending to cause a longitudinal colour stripe.

Cause: The carrier containing the coloured pile yarn cannot be lifted to a height above that reached by the carrier when the peg that is bent or broken is normally selected. The broken or bent peg does not return to the normal position, and therefore it is not clear of the lifting bar when it rises for each row of pile. The design and position of the damaged peg will govern the severity of the fault.

Short Rows.—The tuft is wrapped around one strand of weft and the top of one leg of the tuft is below that of the other; this can occur on either leg depending upon the cause and all the tufts in the width are usually affected.

Cause: Thick weft is not pushed over the comb and thin weft is pushed over too far, the former fault causing a short tuft leg furthest from the comb and the latter fault shortens the tuft leg nearest the comb before beat up. If the reed is almost at beat up when the loom is started the shot of weft is not beaten over the comb and the short row is formed with the appearance of that made by thick weft.

Spool Axminster

Slack Edges.—Loops of weft protruding from the edge, or a wide edge, i.e. the carpet would appear to be wider than the prescribed width of loom.

Causes: (1) Insufficient weft tension either by faulty weft striker action or faulty tension trap device.

(2) Too much selvedge shuttle cord tension due to incorrect setting of the weft, dividing finger, and of the weft placer finger, or due to the shuttle lacing being too tight.

Tight Edges.—Edges pulled in causing the edge tufts to lean over.

Causes: (1) Incorrect shuttle lacing causing too little shuttle cord tension.

(2) Too much weft tension due to fault "striker" action or tension device.

Missing Weft.—A gap on the back of the carpet or a row or part of a row of missing tufts, depending upon whether the missing weft is a top or bottom strand.

Causes: (1) The weft may break during weaving.

(2) The selvedge shuttle threads may break causing the weft to be pulled back into the shed by the returning needle.

Missing Chain Ends.—This fault will show on the back as a gap warpways in the backing structure.

Causes: (1) Faulty material.

(2) Faulty warping.

Slack Place.—This may show up as a distorted place on the surface of the

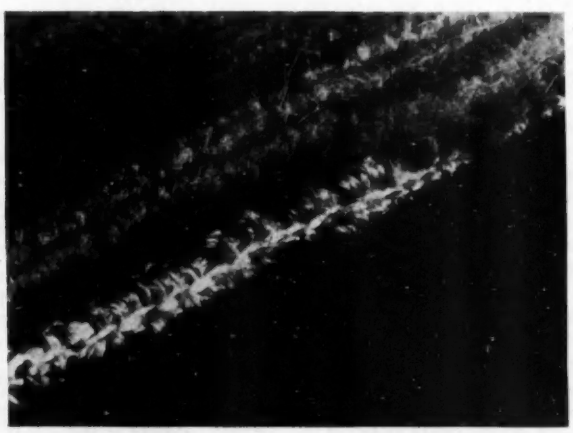


Fig. 4. E-F. Spool axminster weave. Badly formed selvedge, also showing missing tufts

carpet, or the carpet does not lie flat but appears to "bubble" or cockle in places.

Causes: (1) Uneven tension during warping.

(2) Unwinding of the warp during weaving.

(3) The take up roller having an irregular surface.

Crossing – Spool Fault.—This shows on the back more than on the surface of the carpet, and appears as a tuft which has been placed between the chain and stuffer ends and then forced back into its proper place by the comb.

Causes: Misalignment of the tube frame can cause this in that the tubes tend to pass between chain ends and stuffer ends of the same course, rather than between two sets of chain and stuffer ends from adjacent courses.

N.B.—This fault is more prevalent on individual type transferring mechanisms associated with certain types of broadloom.

Crossing – Auxiliary Sley Fault.—This fault, in appearance, is the same as the one above.

Cause: Instead of the tube being the cause of the fault, it is the misalignment of the auxiliary sley which causes the dividing of the stuffer ends from the chain ends.

Wrong Spool.—This may show as a fault in the design of the carpet.

Causes: (1) Spools can be placed in the chain at the beginning of a new pattern in the wrong order.

(2) Faulty design setting can also cause a similar fault.

Missing Tufts.—Small gaps in the pile of the carpet.

Causes: (1) Pile ends may become unthreaded from the tube frame.

(2) Pile ends which have broken or run out during setting and have not been replaced.

(3) Knots of any description can cause this fault in that they may fail to pass through the tube frame.

(4) Yarn ends can spring back up the tube due to relaxation of tension after cutting.

Doubling-In.—Certain tufts will exhibit a shining appearance because their length and not their cross-section is seen.

Cause: The one side of a tuft formed on a previous row may be turned back into the warp by the tufts of the next row.

Short Rows.—These appear on the surface of the carpet as a distinct line weftways. This line is due to all the tufts being longer on the one side than on the other.

Causes: (1) This phenomenon can be caused by insufficient draw off

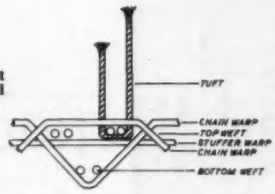


Fig. 5. Short row spool axminster

resulting in too little yarn left protruding beneath the carpet to be turned up by the comb. The resulting tuft will not therefore have both its "legs" of even length.

(2) Spools can become turned or wound up slightly during their passage round the chain, thus too little yarn is presented to form a tuft.

(3) If the sley does not beat up with sufficient force, the tuft may be pulled out slightly during draw off.

(4) Draw-off can occur too early in the cycle.

(5) Too much tension on the spool can cause this fault on the waste side leg.

(6) Short rows can occur where the short leg is on the pile side as opposed to the waste side. This is due to the yarn being at too great a tension during draw off, so that after cutting it will relax and consequently be lower than normal pile height.

"Dirty" Back.—Tufts which tend to show too much on the back.

Causes: (1) Faulty comb and auxiliary comb setting.

(2) Weak or broken comb springs.

(3) Individual comb teeth broken or worn.

(4) An excess of "fly" or waste collecting between the main comb and the auxiliary comb.

(5) Untwisted pile yarn can cause the comb teeth to turn up one end only iu a two-ply yarn.

Suggestions for Improvement

It has been found that all the suggestions for improving efficiency fall into four main groups, namely:—

(1) Careful choice of basic materials.

(2) Installation of, or improved, quality control.

(3) More efficient supervision by all personnel.

(4) Planned maintenance, including the possibility of introducing stop devices where needed.

Examples of improvement which could be made, relating to each group are as follows:—

(1) *Careful Choice of Basic Materials.*—Purchase of the most economic material for carpet weft. In many cases jute is used, and often a lower quality is bought where a higher quality is required; although a saving may be made on the original cost, this is more than offset by difficulties arising in weaving.

Knotless yarns, achieved by joining with a suitable adhesive would help to reduce the number of ends out in all types of weaving.

(2) *Installation of, or Improved Quality Control.*—This ensures careful control of count, turns per inch, and breaking strain of all yarns used. For example, if there is insufficient twist in the pile yarn, half ends are liable to occur in Wilton, and single ends in Axminster, both of which result in a lowering of carpet quality.

(3) *More Efficient Supervision by all Personnel.*—Spools out of order in the pattern chain in Spool Axminster weaving, and mixed bobbins in the creel in Gripper Axminster and Wilton weaving can be attributed to a lack of supervision on the part of the preparation department and the weaving staff. Missing weft which arises after unweaving is usually caused by lack of care on the part of the weaver.

(4) *Planned Maintenance.*—Regular and systematic changing of pile wire blades in Wilton, and checking of tube frames in Spool Axminster, and inspection of grippers and reeds in Gripper Axminster, all result in an improvement in carpet quality.

Stop Motions.—Weft stop motions could be introduced on traditional type Wilton looms. Chain warp stop motions could be introduced to a greater extent on all types of looms.

"Courtolon"

Courtaulds Ltd. announce a substantial increase in production capacity for "Courtolon" bulked nylon yarn. New plant is scheduled to come on stream in September and, to coincide with it, an Exhibition to demonstrate the ever-growing success of "Courtolon" will be staged at the Bell Hotel, Leicester, October 10 to 12. The Exhibition will show a full range of commercial fabrics and garments to members of the making-up, wholesale and retail trade, as well as to manufacturers in the Midlands. A main feature will be a demonstration of development samples showing Courtaulds' knitting customers what can be achieved with this yarn; how "Courtolon" 'X' and 'C' yarns can give every variation in fabric handle and effect which is likely to be required.

* * *

Israel Nylon Plant

A nylon plant with a production capacity of 1,000 tons of nylon textile yarn per annum is expected to be completed shortly at Ashdod, Israel. In a report from Jerusalem, Barclays Bank D.C.O. states that the plant will produce nylon yarns of 15 den. monofil as well as all deniers from 30 to 100 multifil.

Direct and Section Warping of Coloured Stripes

End-and-end lease, smaller number of cones, small number of beams and less waste are some of the advantages claimed for the section warping system

By J. EICHHOLZER*

THE direct warping system is very well employed for the manufacture of plain cotton warps and is, certainly, the right system for this job. To get, for example, weavers' beams of 55 ins. width with 6,000 ends, 10 back beams with 600 ends and each 55 ins. wide are produced from a creel holding 600 packages. Naturally with such a low number of ends on 55 ins. width, a great length of yarn can be wound on to the back beam. According to flange diameter and count of yarn the length ranges between 15,000 and 30,000 yards.

The operation varies only slightly from mill to mill according and fundamentally is as follows. The ends on each of the 10 back beams are fastened off with adhesive tape to maintain the correct order of the ends and to make sure no ends are missing. The 10 back beams are then put into a creel behind the slasher and the warp sheets collected at the entry side of the slasher. The splitting of the ends after the drying section takes place in such a manner that split cords between each back beam are run into the machine. The expanding comb at the end of the slasher is struck into the warp sheet now containing 6,000 ends. Irregularities are corrected by hand. Now we have a total of 6,000 ends in 55 ins. width. These ends can be wound on to the weavers' beams. Even if the weavers' beams have flanges with 31½ ins. dia., only about 3,000 yds. of the above-mentioned warp can be wound on to each beam. Therefore, the back beams provide enough length to produce 5 - 10 weavers' beams. The ends of each weaver's beam are glued with an adhesive tape from which they are tied to the previous warp in the loom. Delicate grey cotton warps are sometimes provided with an end-and-end lease to guarantee the correct order of the ends and good running in the loom.

The operation for producing coloured striped warps is, in principle, the same, but it is very often difficult to get a favourable number of ends of each colour. If we choose again the example of a warp with 6,000 ends and at the same time imagine a repeat of 6 ends white and 6 ends red throughout the whole warp, it is clear that the easiest thing to do is to produce 5 back beams white and 5 red. The simplest way to solve the warping operation is to use two direct warping machines, if there are two such machines available. If this should not be the case, recreeling cannot be avoided.

If warps with complicated repeats and more than two colours are produced, it is repeatedly the case that ends of two and more colours have to be wound on to the same back beam, whereby the control and supervision of the operation is rendered more difficult. It is then also necessary that each individual end is placed into the correct dent of the expanding comb according to the repeat which, of course, wastes a lot of time. The splitting of the sheets according to the colours is not possible anymore. Furthermore, every end on the weaver's beam must initially be creeled as an individual package, causing waste material and additional work, i.e. getting the right number of packages or splitting up a number of packages. Moreover, not every warp has to be slashed and, therefore, a separate beamer is necessary or the slasher must be used for dry taping.

In Europe especially, rarely are long orders booked of the same colour repeat. Usually the colours are changed after a comparatively short run and, therefore, the back beam system loses its significant advantage and becomes more expensive than the alternative system.

Section Warping

From the beginning we can say that the section warping system is out of the question for producing long plain cotton warps, except when only a very short warp, a very delicate warp or a single coloured warp of different materials, has to be produced, or when the machinery for direct warping is not available.

Fundamentally, with the section warping system the actual weavers' warp is manufactured. Instead of 10 back beams with 600 ends each in the whole width of 55 ins., 10 sections of 600 ends and 5½ ins. width each are wound side by side on to the drum. The density of the ends in each section is the same as on the loom, therefore a 1:1 end lease can be put into each section at the same place, which simplifies the next operation and saves time. Naturally it is not possible to wind as much length on to a drum as on a back beam.

With a handy device on the leasing arrangement, split leases for the split rods after the drying section on the slasher can be inserted without difficulties. Splitting of the colours is not possible but this is not required because the ends are not now laid into the expansion comb, the latter being struck into the warp regardless of the correct number of ends per dent. The end-and-end lease which comes at the end of every warp ensures the right order of the ends in the warp.

The section warping system has other important advantages; for example, warps such as terry towel warps which do not have to be slashed are beamed-off on the same machine. Secondly, for coloured striped warps only one repeat has to be creeled and this one can be repeated as many times as are necessary to get the full-width warp.

Basically, the section warping system also allows that a small number of ends of each colour can be wound repeatedly on

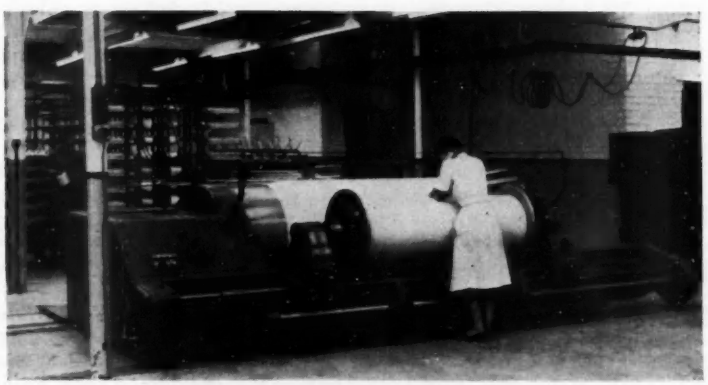
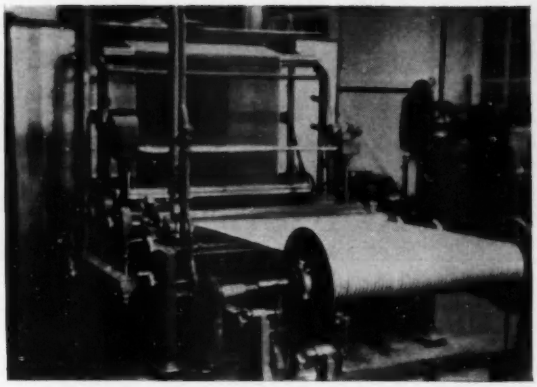


Fig. 1. Preparing fancy striped cotton warps by the section warping system at Ashton Bros. and Co. Ltd., Hyde

* *Benninger Engineering Co. Ltd., Switzerland*

(left) Fig. 2. The section with pattern repeat running through the guide reed on to the top of the drum of the section warping machine



(right) Fig. 3. One back beam, prepared by the section warping system, in position at the entry of the slasher

to the drum side by side to get the necessary total number of ends. If only a few cones or packages are available, it is not required to split them. This system in itself is much more flexible.

We believe that this explanation shows quite clearly the difference between direct and section warping. But where and when should one work with this or the other system? Perhaps the following time comparison will give a lead.

We want 4 weavers' beams, each 3,000 yds. long, with the following repeat:—

300	ends	white
50	,,	red
10	,,	yellow
70	,,	green
20	,,	white
20	,,	yellow
70	,,	green
10	,,	yellow
50	,,	red

a total of 600 ends × 10 times = 6,000 ends

Total number of ends of each colour in this warp:—

3,200	ends	white
1,400	,,	green
1,000	,,	red
400	,,	yellow
Total 6,000	ends	

A creel with 600 ends is available. Count 21s 2-lb. cones with each approx. 36,000 yds. length of yarn.

Direct Warping

White:

3,200 ends each 12,000 yds. long. Five warps each 600 ends and 1 warp 200 ends. From the first lot of cones 3 back beams can be produced; from the second lot of cones 2 more back beams are made and the remaining yarn length is used for the last 200 ends.

Warping speed, 800 yds./min.
1 warp = 12,000 : 600 = 20 min.

5 warps	75 min.
Change of beams and resetting	10 ,,
10 breakages of ends	10 ,,
	95 min.

Green:

1, 400 ends	
2 warps	30 min.
Change of beams and resetting	4 ,,
4 breakages of ends	4 ,,
	38 min.

The remaining 200 ends which are necessary are wound on to a back beam together with the red ends.

Red:

1 warp	15 min.
2 breakages of ends	2 ,,
	17 min.
1 warp red/green	17 ,,
1 warp yellow/white	17 ,,
Warping time total ..	184 min.

Creeling time has not been taken into consideration.

Total 10 *back beams of* 12,000 *yds. each.*

Slashing machine:

Setting of beams (10 beams, 3 min. each)	30 min.
Putting-in split cords and split rods	10 ,,
Laying-in 6,000 ends in a repeat in the expansion comb ..	120 ,,
Exchanging and sticking weavers' beams	20 ,,
Speed of slasher 30 yds./min.	400 ,,
Total ..	580 min.

Putting end-and-end lease in one machine 8,000 ends/h., total 24,000 ends	180 min.
Setting each warp for leasing ..	40 ,,
Time for slashing and leasing	800 min,
Plus warping time	184 ,.
Total ..	984 min.

Total time for 4 *warps* = 16 *hours* 24 *min.*

Section warping:

1 repeat of 600 ends is creeled (2 creels available).
One end-and-end lease.
5 split leases.
Speed of warper, 600 m./min.

Running time per sect. 5 min.

1:1 lease ..	1 ,,
5 split leases ..	2 ,,
1 end breakage ..	1 ,,
9 min. × 10 =	90 min.
Setting of warper	5 ,,
Beaming speed, 150 yds./min.	20 ,,
Setting time for beaming ..	5 ,,
Per warp ..	120 min.
4 *warps* ..	480 min.

Here also the creeling time is not taken into consideration.

Slasher:

Change of beams and setting time per warp 10 min. ..	40 min.
Running time	400 ,,
	440 min.
Plus warping time	480 ,,
Total ..	920 min.

Total time for 4 *warps* = 15 *hours* 20 *min.*

Summary

Time involved for producing 4 weavers' beams slashed and with end/end lease:—

Direct Warping System:	Section Warping System:
16 hours 24 min.	15 hours 20 min.

This comparison shows that in this particular case preference should be given to the section warping system. The limit at which the section warper is more economic lies around 12,000 - 15,000 yds. of the same warp construction. The section warping system is not only quicker but it needs less cones than the direct system.

Section Warping

600 ends in the repeat 10 sections 3,000 yds. each = 30,000 yds.

Per warp we need one creeled lot = 600 cones.

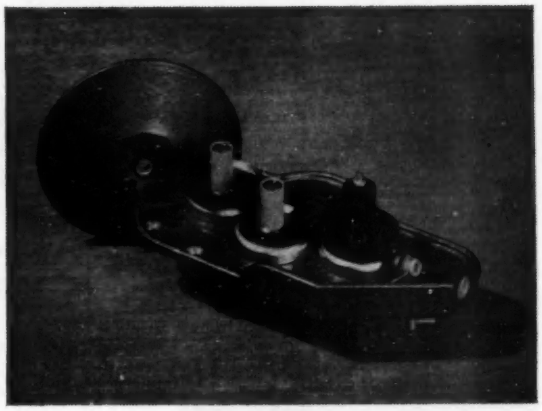
4 lots = 2,400 cones total

Direct warping:

White	2 lots	=	1,200 cones
Green	1 lot	=	600 ,,
Red	1 lot	=	600 ,,
Yellow	1 lot	=	400 ,,
Total ..			2,800 cones

The H.S. Tension/ Stop Motion Unit

Features in a new unit designed to handle delicate yarns



THE H.S. tension/stop motion unit, introduced several years ago in continuous aluminium alloy extruded channel form, is now available in the form of an individual unit. Its aim and function, however, is in no way changed, in that it is designed to give maximum control over the yarn in the creel, whilst at the same time exerting the lowest possible tension. Performance under mill conditions has illustrated its value as an aid to warping, particularly where unthrown synthetic yarns are processed. It has also been used successfully in slightly different form as a compensating tension device fitted to pirn winders.

The individual units are supplied in both right-hand and left-hand form, and for warping may be obtained from the supplier either incorporated into a complete hack or magazine creel, or individually for the purpose of creel conversion. Most creels commonly in use can quickly and easily be converted for use with the H.S. unit.

As will be observed from the photograph, each unit consists of a casting, which incorporates a balloon control disc and also carries three tension posts and a compensating arm. Two of the tension posts, adjustable in "T" slots, are supplied with normal tension discs, whilst the third, nearest to the outgoing eyelet of the unit, carries a yarn trapper in the form of a "top-hat." Between the top-hat and the exit eyelet, the wire compensating arm projects through a slit in the casting. This is connected, below the casting, to a counter-weight in the form of a pawl and also through the tension post to the top-hat, which is raised or lowered as variations of yarn tension pull down or release the compensating arm. Tension posts and the three eyelets (one in the compensating arm) are of "Regalox" conductive ceramic materials.

Each unit is quickly and easily threaded up in one operation by means of the threading hook supplied by the manufacturers, and the normal yarn path through the unit is from the package, through the ballooning disc guide eye, under the two normal tension discs, under the "top-hat" and through the compensating arm guide eye to the outgoing eyelet, where the thread turns through only 45° on its way forward to the front of the creel.

When the warper is brought to a stop for any reason other than a thread breakage, the compensating arm will rise upwards to take up any slack yarn between package and the tension unit itself, and the "top-hat" is lowered to trap the yarn and maintain tension. Further movement of the compensating arm will then take up any slack between the tension unit and the creel gate, and again maintains control over the yarn. In this way, difficulties caused by snarling and tangling are completely avoided In the event of a broken thread, the compensating arm moves up freely under the weight of the pawl, which itself makes contact with a screw, completing the electrical stop motion circuit and switching off the warping headstock.

The performance of the H.S. unit, over a wide range of operating conditions, has demonstrated its value as an aid to better warping. In weaving and other processes the quality of yarns handled tends to improve generally and a large proportion of yarn faults occurring are attributed to the warping operation Of these, many will probably be caused during passage of the yarns through creels whose design and construction, though good enough for handling the man-made fibres, are inadequate for dealing with delicate unthrown synthetic yarns. This is supported by the results of investigations made by the yarn suppliers unto customer's complaints where in many instances the damage has been directly traced back to the creel.

The H.S. unit has been designed to handle delicate yarns; its low tension characteristics, comparatively straight yarn path, small angles, and accurate ballooning length all contribute to a firm but gentle handling of the yarn. It is claimed that lower running tension, combined with the replacement of the creel gate and dropper type stop motions by the H.S. stop unit incorporated in each unit, ensures lower friction co-efficients and consequently greatly reduced static charges. Furthermore, the scoring action of dropper wires on synthetic yarns is avoided, and both factors contribute to an improvement in the quality of warps produced.

The makers also point out that an electronic warp inspector and the H.S. unit work extremely well together in raising the productive capacity of a warper and creel. The higher warping speeds made possible by the H.S. unit work in favour of the warp inspector, since the latter instrument operates at its maximum efficiency at high speed. Secondly, the warp inspector can be relied on to "see" yarn faults and stop the machine, thereby relieving the operative of the necessity to spend all his time watching the warp sheet.

The H.S. tension/stop motion unit, which has been patented throughout the world, is manufactured by H. Stanier and Co. Ltd., Pontypridd, and is marketed by Coates Smith Ltd., Cawley House, Canal Street, Nottingham.

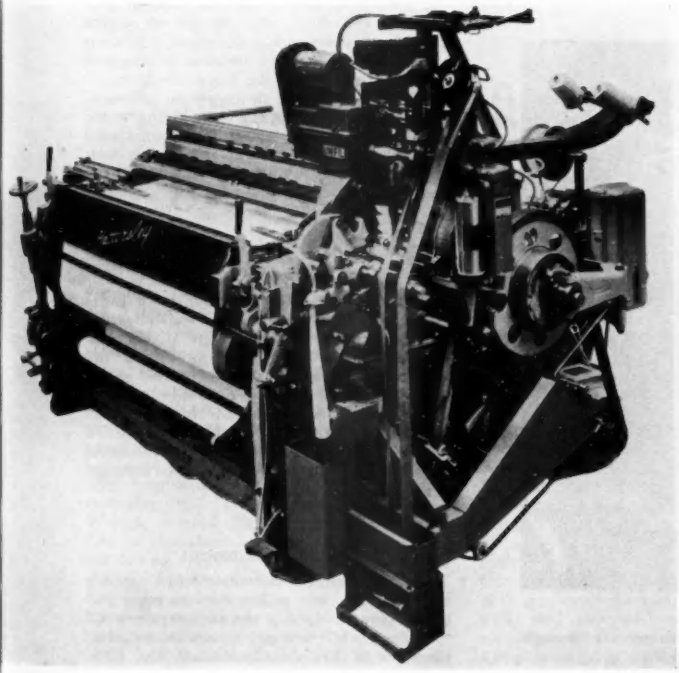
TEXTILE MACHINERY and MILL EQUIPMENT NEWS

Hattersley's 382 Model Loom with Unifil Winder

Weft winding on the loom is claimed to have many advantages, including reduced labour cost, elimination of pirn handling, reduction in the number of pirns and less waste

THE result of several months co-operation between the engineers of the Leesona Corporation and Leesona Holt Ltd., makers of the Unifil loom winder, and those of George Hattersley and Sons Ltd., a new model of the firm's well-known Model 382 automatic pirn-changing silk and rayon is now available equipped with the Unifil pirn-winding attachment. At a recent press demonstration in the company's Keighley works this latest 382 loom was shown weaving a 5-shaft nylon satin, 42½ ins. wide, with 240 ends and 116 picks/in., running at 185 p.p.m. Treading was by seven positive outside cams running at two ratios to give an excellent shed. The yarn being woven was 45 den., 15 fil., 7½ turns Z-twist nylon (B.N.S. Ltd.) and the weft—from cones—was pirned on the loom by the Unifil mechanism.

First introduced in 1937 the 382 was then a 2×1 box automatic shuttle-changing model with cam dobby. Other models also included 4×1 box shuttle changers, and 4×4 box pick-at-will versions. Post-war demand was met by the shuttle-changing model but in 1957 a further choice of weft replenishing motions became available by the adoption of the automatic pirn changers made by George Fischer Ltd., Schaffhausen, Switzerland, for up to four colours of weft. Concurrent with



(left) Hattersley's 382 Model pirn changing automatic equipped with the Unifil loom winder

(below) Mr. V. Duxbury (Manchester College of Science and Technology), Dr. F. Happey (Bradford College of Technology), and Mr. D. C. Snowden (Leeds University) examining a pirn wound on the Unifil loom winder

this development, the loom was redesigned for low build and new treading motions were introduced.

The Unifil attachment, now an integral part of this new single shuttle loom, was first introduced in America in 1950. Since then it has been extensively developed and tested and over 40,000 units are now in operation. As a system of pirn supply for the loom it is very firmly established and is particularly suited to filament yarns. Briefly, the Unifil consists of three major components: winder, magazine and stripper, performing an automatic cycle in four steps—(*a*) winds pirns and delivers them to the magazine, (*b*) transfers pirns into the shuttle, (*c*) removes weft bunches from exhausted pirns and (*d*) returns empty pirns to the winding mechanism.

Equipped with the Unifil this latest 382 model occupies no more floor space than the conventional loom. Further, the company emphasise that the integration of weft winding with the automatic loom offers many economies, amongst the most tangible being:—

(1) Labour cost reduced by redeployment of winding, battery filling and stripping operatives.
(2) Pirn handling eliminated between winding department, weft store, weaving shed and stripping room.
(3) Floorspace formerly occupied by winding and stripping machinery is released.
(4) Pirn stocks kept to 14 per loom.
(5) Loom waste reduced and kept in clean condition.

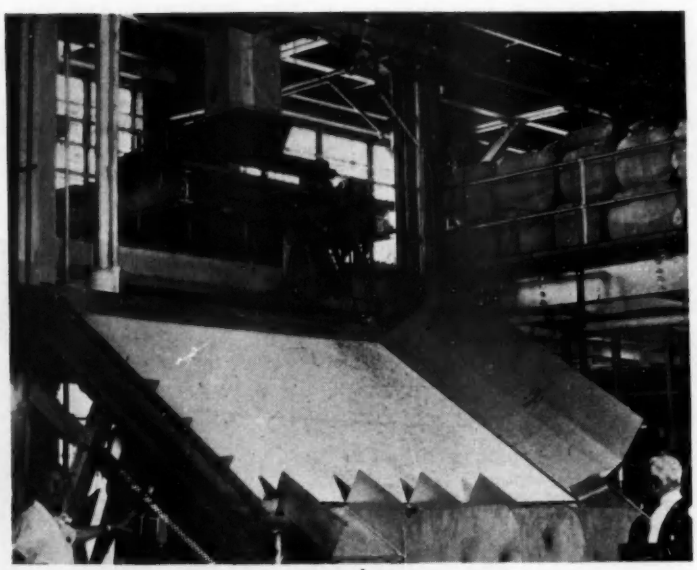
Versatility is one of several features in that various counts of weft can be handled by the unit without major re-adjustment and weft changes can be made quickly from one yarn to another. No large stocks of pirns need be built-up before making a change so that production planning is consequently simplified. Wastage of left-over pirns is eliminated and it is also claimed that cloth quality may be improved. The sequence of winding and weaving is identical and the yarn tension on each pirn remains constant at each loom. Clean weft is assured because full pirns are never handled and mixed weft is virtually impossible. Defects from damaged pirns or faulty supply packages are confined to one loom.

Aerodynamic Cotton Cleaner

AGRICULTURAL utilisation research engineers of the U.S. Department of Agriculture have recently developed an entirely new type lint cotton cleaning device in order to help the textile industry efficiently process ginned cotton that has been harvested mechanically or by hand snapping of the bolls. The new unit, called the "Aerodynamic Cleaner," was developed by the Southern Utilisation Research and Development Division of the U.S. Department of Agriculture at New Orleans, Louisiana. The new type cleaner can be installed on either of two lint cotton opening machines developed earlier by research engineers at the New Orleans laboratory. These machines, known as the "SRRL opener" and the "SRRL opener-cleaner," were intended for use in the preparation of baled lint cotton for processing into textiles.

As an attachment to the novel opener the new machine provides about 15% cleaning capacity in removing trash from cotton processed in the opener. Without the new cleaner, the opener does not clean cotton. The new "Aerodynamic Cleaner" also increases by about one-third the cleaning capacity of the "SRRL opener-cleaner." The two units together will remove 35 to 45% of the trash from lint cotton.

An important advantage of the new "Aerodynamic Cleaner," in which the *aerodynamic and mechanical forces are combined to loosen and remove the trash*, is its ability to remove "pepper" trash, tiny bits of leaves and bark that are difficult to dislodge in ginning. It is fitted with specially designed brushes that also act as fans. These not only sweep the cotton from toothed, revolving cylinders but blow the cotton through a duct to a cleaning area. There is a sharp bend in the duct just before it reaches the cleaning area. As the brushes contact the cotton, they first loosen the trash from the cotton and then whip it through the duct. As the cotton whips around the sharp bend, the trash is thrown to one side. The new machine is attached to the output end of the "opener-cleaner." The new unit was designed by Messrs. M. Mayer, J. I. Kotter, R. A. Hetherwich, and H. W. Weller, agricultural utilisation research engineers, under the supervision of R. A. Rusca. A public service patent for the unit has been applied for.



The "Aerodynamic Cleaner." Seeds are fed at rates of up to 50 tons per day through the feeder

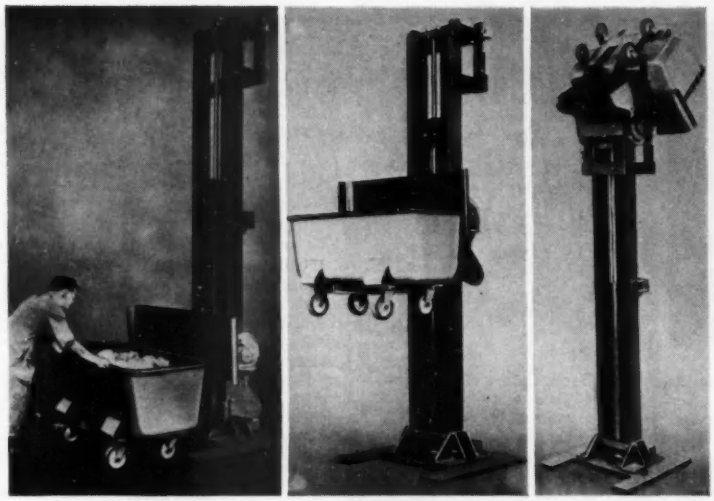
Thread Guides

Lodge Plugs Ltd., Rugby, have published a comprehensive mill wall chart of their standard range of "Sintox" ceramic thread guides. The chart is folded for convenient storage, but can be pinned to the wall, when all guides available can be viewed. Sole selling agents for "Sintox" guides are Crabtree Textile Accessories Ltd., Colne, Lancs., to whom application may be made for the new standard-range chart.

* * *

New Appointment

Mr. C. Baillieu has now taken up his appointment as publicity manager of Chemstrand Ltd., manufacturers of "Acrilan." He was previously advertising manager of British Aluminium Co. Ltd.



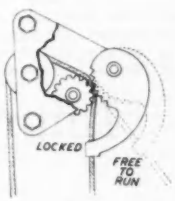
Conveyancer Fork Trucks Ltd., Warrington

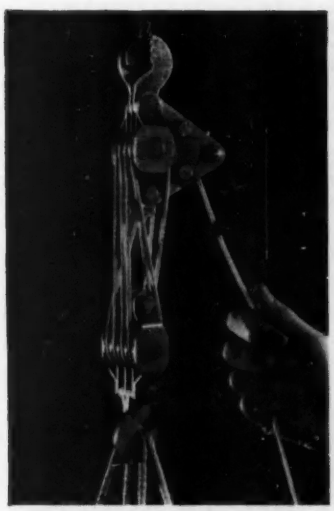
Hopper Loading Units

EACH unit consists of an elevating and tilting assembly, operated by an electro-hydraulic power unit. Dependent on load requirements, single or twin lift jack arrangements are utilised. The elevating and tilting assembly comprises a fabricated, floor-mounted steel base plate to which is bolted two braced, vertical, steel channels. A toothed rack is located on the top outer side of each channel. Standing upright and located centrally between the channels are two hydraulic jacks, each carrying two lift chains and a pulley. The chains pass over the pulleys and are connected between the rear cross brace of the fixed channels and the two-section carriage assembly which is free to slide up the channels on rollers. The tilting section, mounted on the fixed section of the carriage, carries a set of load forks, and has a toothed gear segment fitted on each side. On certain carriage/fork arrangements a safety catch is also incorporated. The power unit has a three-way control station with "start," "stop" and "emergency down" positions.

A loaded container is wheeled into position on the load forks and is held by the spring-loaded safety catch, when fitted. On selection of "start" the motor drives the hydraulic pump and fluid is delivered under pressure to the base of both jacks. The jack piston rods, complete with pulley assemblies, are extended, and this movement is transmitted via the chains to the carriage assembly, which is lifted up the channel sections at a ratio of 2:1 to jack movement. As the carriage nears the top of the channel sections, the toothed gear segments engage with the racks, and at the same time, a fixed pin on the carriage trips the pivoted lever, which, via the push rod, sets the hydraulic valve in readiness for the return tilt of the carriage. The mating of the segments and racks produces the tilting action and as the carriage continues to rise it is tilted upwards, and over, the top of the channels until the upper limit switch is depressed and the motor stops. The time that the carriage stays in the tilted position can be pre-set from zero to three minutes. After this, an electro-hydraulic valve opens and the carriage begins the return tilt at a greatly reduced speed because the oil flow is restricted by the hydraulic valve which was pre-set by the carriage on its upward movement. This reduced speed continues through the return tilt until the carriage, as it leaves the racks again, trips the lever and opens the valve. The carriage then returns to floor level at an increased speed, where it depresses the bottom limit switch and returns the electrical circuits to the starting position, and also releases the safety catch to allow the empty container to be wheeled away.

Safe, Rapid Lifting by Midget Hoist

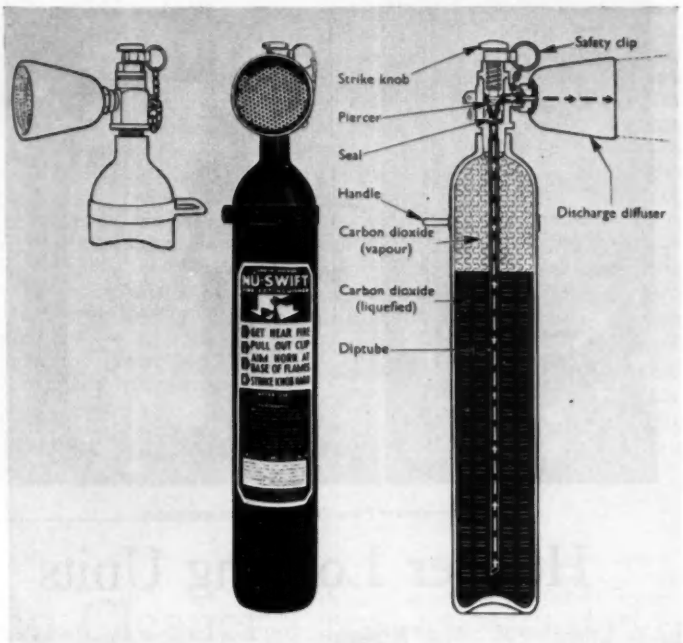




THE textile industry, perhaps more than any other, has a limitless range of uses for small, sturdily-built and reliable lifting, etc., equipment. Loaded skips and cases, beams and rolls of cloth, heavy machine parts, motors, rimshafts, spring-top and dobby motions, loom crankshafts, etc., are only a few of the innumerable applications demanding quick but safe methods in dealing with them. The versatile Autolock midget hoist, manufactured by Haltrac Ltd., Bourne Works, Weimar Street, London, S.W.15, has a hundred-and-one different uses for lifting, hauling or dragging purposes. As will be observed from the illustration, the hoist is compact in size and made of specially tempered aluminium (ensuring lightness allied to great strength) together with high tensile plated steel bolts, nuts and washers, and eight nylon pulley wheels. Weighing only 1½ lbs., it can fit into any confined space, tool box or small cupboard and is claimed to be completely rustproof and requires no lubrication.

Supplied with the Autolock are 72 ft. of braided nylon cord which, passing through eight pulley wheels, gives an 8 : 1 reduction. The equipment is stated to have been tested to a breaking strain of more than 1,000 lbs. on a straight lift and is reported to be capable of moving a car, trailer or caravan weighing up to 2½ tons. The Autolock is simple in operation. When a load is pulled at an angle the cord runs free; if released, the cord is instantly held between toothed nylon cams. A sideways pull, and the load is free again. The midget hoist's normal length of 72 ft. of nylon cord gives a lift of 9 ft. and is priced at 87s. 6d. Without the Autolock the hoist costs 57s. 6d. Longer lengths of cord, giving lifts of up to 27 ft. can be obtained.

Fire Fighting at Close Quarters



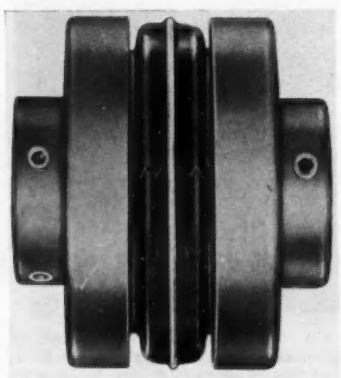
A LEAK-PROOF, strike-knob, 5-lb. carbon dioxide fire extinguisher, Model 1505, is announced by Nu-Swift Ltd., Elland, Yorkshire. The new model is complementary to the 10-lb. Model 1510, marketed in 1958. Mainly intended for fighting inflammable liquid fires, and fires involving electrical equipment indoors, the new extinguisher has a mean range in still air of 11 ft., the carbon dioxide being expelled, for 8 secs. at 65 F., through a novel type of discharge diffuser. Designed for fire fighting at close quarters, it is capable of putting out a 6 sq. ft. inflammable liquid fire. In the case of an experienced fire fighter, the corresponding figure is 9 sq. ft.

Carbon dioxide is non-damaging in use and leaves no residue. It is invaluable for fighting fires in laboratories or fires involving fine chemicals or complicated electrical or electronic equipment. Its small weight of 19¼ lbs. enables the extinguisher to be handled comfortably by women, while it can be reloaded on the spot in 60 secs. by any competent person. Like all Nu-Swift models, the extinguisher is operated in the upright position. The new model has been approved by the Ministry of Transport (Marine Section) for use on merchant vessels.

New Flexible Coupling

A NEW type of flexible coupling claimed to provide dependable power and withstand all types of misalignment and end float has been introduced by R. and J. Dick Ltd., Greenhead Works, Glasgow, S.E. Called the Quadriflex, it is said to have exceptional torsional flexability—15° at peak torque—and the ability to absorb vibration and shock thus resulting in smoother operation for both driver and driven equipment. Simple in design, the coupling consists of two flanges and a two-piece flexible rubber sleeve. The teeth of the sleeve halves lock into the teeth of the flanges without clamps or screws and tighten under torque to provide smooth transmission of power.

The coupling is unaffected by abrasives, dirt or moisture. There is no metal-to-metal contact and the absence of wear eliminates the need for lubrication or maintenance. Operation is noiseless. The external finish is smooth and there are no protruding nuts or bolts. The rubber sleeve acts as an electrical insulator between the driver and the driven unit. Installation is quick and easy. Simply slide the flanges on to the shafts, fasten one into place, insert the two-piece flange into place and fasten. Alignment can be checked with a straight-edge placed across the outside of the precision machined flanges. A retaining ring is supplied for high speed operation.



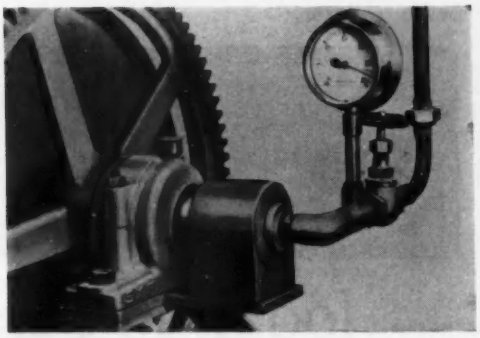
Improved Seamless Hose Machine

THE "Lonati" twin-feed seamless hose machine, introduced to the U.K. and the Commonwealth over 12 months ago, was originally conceived as a twin-feed machine and rapidly established itself as being capable of exceptionally high speed production, producing high quality fabric. Sturdy construction and simplicity of design ensured relatively easy maintenance and accessibility; mainly the result of the short cylinder. The latter point proved to be a real advantage, bearing in mind that as far as this country is concerned, twin-feed machines were a new venture and skilled mechanics and operators, therefore, at a premium.

Lonati recently introduced a small selector drum which, it is stated, not only gives the machine maximum selection but also produces every known variety of fancy patterns which can be applied to the after-welt, toe and throughout the panel, as well as a fully effective two-way ladder stop. A further modification now gives it a safe production speed of 240 r.p.m.

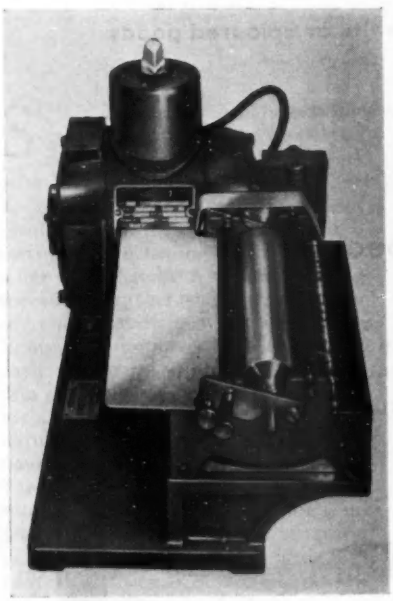
An individual multi-speed motor, integrally built into the machine, gives four speed control. This reduces the possibility of loop distortion which sometimes occurs when yarn changing at high speed, and also facilitates yarn changes. To meet the requirements of British manufacturers fully, the "Lonati" machine is now fitted with a second set of knock-over cams which give welt extensibility up to 15 ins. with considerably improved welt fabric. Sole agents for the U.K. and the Commonwealth are Coates Smith Ltd., Cawley House, Canal Street, Nottingham.

Sealing Against Steam, Gas or Liquid Leakages



PRACTICAL running tests are said to have shown that the new Swindells' "Rotocon" seal gives engineers the answer to the sealing against leaks of any rotating member whether the medium be gas, vapour or liquid. In drawing attention to its features, the company point out that other known types of seal rely on either a flat face-to-face joint or a joint on the parallel cylindrical member and, they say, both these arrangements are subject to criticism from a wear compensating point of view, especially if there should be any faulty alignment. The "Rotocon" seal is designed to overcome these problems and owes its effectiveness to the fact that sealing takes place on a conical face of inorganic material. This creates a mirror finish on its own bearing surface and, because of the low frictional value of the material, gives an improved sealing surface with continued use. The conical male component of the seal can be made of practically any metal as a separate unit to the original cylinder or, alternatively, the cylinder shaft itself can be coned for this purpose. A leaflet which gives full details and diagrams showing the construction of this new seal is available from the manufacturers, Emerson and Renwick Ltd., Peel Bank Works, Church, Accrington.

Electrically-operated Label Gumming Machine



The "Beatall" machine has the gum box, feed and delivery units mounted on a one-piece bed

Farrow and Jackson Ltd., 41-42 Prescot Street, London, E.1, have recently redesigned their "Beatall" range of label gumming machines to meet the need for fairly constant use where fully automatic and specialised machines are not necessary. Label sizes are governed by the maximum roller width of each model, length being up to reasonably handled proportions, there being no adjustments necessary for the five different sizes—6, 8, 10, 12 and 14 ins. Each model is supplied complete with an enclosed drip-proof ½ h.p. geared motor and top mounted switch, the whole assembly together with gum box, feed and delivery units being mounted on a solid one-piece base.

Operation is simple: after having broken down the concentrated gum with water to the desired consistency, it should be poured into the gum box up to a height of approximately a quarter inch above the bottom of the main gum roller. Maximum efficiency is obtained with a minimum use of adhesive and a finely ground-in adjustable scraper is provided to control the amount of gum applied to each label; a conveniently placed adjusting screw is provided for this purpose. After switching the labels are slid under the guide roller and are automatically drawn across the gumming roller to be delivered ready for immediate application. The rollers, scraper and gum box assembly, etc., are easily removed for washing.

New Recording Hygrometer Alarm

SHAW Moisture Meters, Westgate, Bradford, announce a new recording hygrometer alarm incorporating a new sensing element which enables the instrument to record continuously, the humidity of any atmosphere under pressure or in a vacuum. Giving immediate warning of any alteration in dewpoint, the transistorised alarm needs a minimum of attention and can withstand a pressure of 3,000 p.s.i. It is fully stabilised for 190 to 260 volts, has a response time of 1 second and a chart speed of ½ in. per hour. A notable feature is the instrument's range of approximately 10 million to 1 and dew points down to — 150°C. can now be measured by this reasonably priced, accurate method. The manufacturers state that the instrument is available for a trial before purchase, and delivery is immediate from existing stock.

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Felting and Shrinkage of Wool During Washing

Modification of the felting power of wool by application of polymers and resins is, as yet, incompletely understood since it does not seem possible to predict whether or not any particular resin will be effective

By B. C. M. DORSET

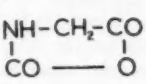
SINCE an early American discovery that the felting properties of wool could be reduced considerably by depositing within or upon the fibres an insoluble resin resulting from the polymerisation of a methylated melamine methylol monomer there has been the incentive to investigate further such resin-finishing of wool materials with a view to finding an improved process. This early treatment required the application of a relatively high proportion of resin to make the material acceptably shrink resistant and under these conditions the wool acquired a firm handle and an objectionable yellowish tone. At first, it was thought the resin was deposited in the fibres but critical examination revealed that a large part of it was outside. Ultimately the view was taken that shrinkage resistance was primarily caused by evenly distributed "pin-point type" fibre binding which hindered the fibre movement known to be necessary in wool felting.

Some progress was achieved when it was discovered that if the wool was first oxidised with hydrogen peroxide the amount of resin to confer adequate shrink resistant properties could be reduced by about 50% but even this has not made the process generally acceptable.

Many advantages can be obtained from a satisfactory shrink-resist process based on the resin treatment of wool. Further, whereas resin treatment gives wool material an increased weight proportioned to the amount of resin applied, chemical treatment usually results in a weight loss of up to 5%. There is also the further point that the resin treatment of cellulose fibre goods has had such remarkably good results that it seems valuable fibre modifications ought similarly to be obtained in wool materials. However, so far, the resin finishing of wool has not attained the success forecast for it; yet, it is a line of research never entirely neglected and from time to time further progress is made. Recently Bradbury and Leeder (J. Text. Research, 1960, **30**, 118) recorded investigations of a shrink-resist treatment for wool based on the application of a resin derived by polymerisation of thiazolid 2:5-dione.

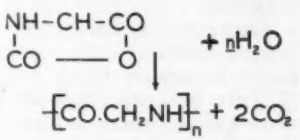
In order better to understand how this substance has come to be used for reducing the felting properties of wool it is necessary to refer to earlier work by Baldwin, Barr and Speakman (B.P. 567,501 and J. Soc. Dyers and Col., 1946, **62**, 4) in which it was disclosed that wool could be made substantially non-felting by treatment with anhydrocarboxyglycine under conditions such that it polymerised within or upon wool fibres. Anhydrocarboxyglycine having the formula given in Fig. 1. would appear a very suitable substance (in polymerised form) to be deposited on the scaly surface of wool fibres to make them smoother and less liable to felting. Thus when polymerised apart from the fibre it yields a white polymer resistant to a wide range of solvents; it is also tough and highly flexible in film form. When this polymer is formed in the wool surface it seems to be strongly anchored there since it increases the resistance of the wool to abrasion to three times that of untreated wool and it cannot be extracted from the wool by treatment with a concentrated solution of lithium chloride which is a solvent for the polymer when formed apart from the wool. It is possible that this polymerised anhydrocarboxyglycine is chemically combined with some of the basic side chains known to be attached to wool keratin molecules.

Fig. 1



The essential feature of this treatment of wool lies in securing polymerisation of anhydrocarboxyglycine in the fibre surfaces by activation with water as shown in Fig. 2. Obviously it is not possible to apply the anhydrocarboxyglycine to wool from an aqueous liquor since polymerisation would occur prematurely in this liquor. Of the organic solvents examined it appears most satisfactory to use

Fig. 2



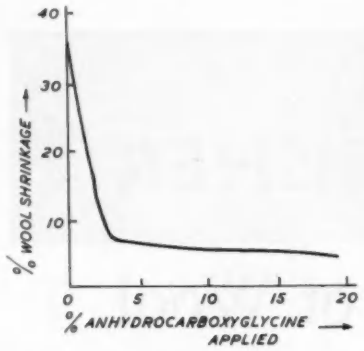


Fig. 3. Curve showing how the application to wool of increasing amounts of anhydrocarboxyglycine reduces the felting shrinkage of wool fabric

ethyl acetate containing a small proportion of water. In one recommended process 2·5 parts of air-dry wool fabric were treated for 8 hours at 50°C. in a solution of 0·25 parts of anhydrocarboxyglycine in a mixture of 80 parts of ethyl acetate and one of water. The fabric was thereafter removed, freed from solvent by drying, and rinsed in hot water. When washed in a hot soap solution it only shrank 1% compared with 30% for untreated comparable wool fabric. Generally, it is recommended to apply 5 to 10% of anhydrocarboxyglycine calc. on the weight of wool as shown by the curve in Fig. 3 which applies to a wool treatment as described above using varying amounts of the reagent and a treatment period of 4 hours.

From a general viewpoint this process for making wool unshrinkable is very satisfactory (apart from high cost) since it is not possible to extract the polymer from the wool by organic solvents such as alcohol, benzene, trichloroethylene, white spirit, and petroleum ether used at their boiling points. Further, in a series of wear tests the number of rubs required to wear a hole in the treated fabric was (on average) 7,900 against 2,413 for the untreated fabric. Measurement of the scale roughness of treated and untreated fibres in a 0·2% soap liquor showed the former to have 40% less roughness.

The potential advantages of the anhydrocarboxyglycine treatment induced Alexander, Bailey and Carter (J. Text. Research, 1950, **20**, 385) to investigate its application more closely and to examine the possibility of using other N-carboxy anhydrides which can conveniently be prepared by the method of Bergmann (Ber., 1932, **65**, 1192). These workers established that the efficiency of the anhydrocarboxyglycine treatment depended to a large degree on the pH of the wool at entry into the reactive solution in ethyl acetate. When the wool was acid it proved impossible to effect a reduction of felting power but with wool brought to pH 9—by use of a borax-phosphate buffer solution which was rinsed-off before treatment of the wool with the anhydrocarboxyglycine —maximum unshrinkability could be obtained with least adverse effect on the softness of handle.

It was also established that during the prolonged treatment of wool with a 5% solution of anhydrocarboxyglycine in ethyl acetate containing a little water some hydrolysis of the solvent occurred with liberation of acetic acid sufficient to reduce the evenness of action on the wool and also the overall efficiency of the treatment. For this reason diethyl carbonate was used as an alternative solvent having greater stability. In this way the treatment finally adopted as being most satisfactory consisted of pre-treating the wool to bring its pH to 9, drying to a moisture content of 17%, and then treating for 2 hours at 50°C. with a 3% of the anhydrocarboxyglycine dissolved in diethyl carbonate to which 1% by volume of water has been added. The preferred liquor/wool ratio is 25/1. It is claimed that unshrinkable wool is produced with the least adverse effect on its other properties, notably its softness of handle.

Among many other N-carboxy-anhydrides examined including N-carboxy-DL-alpha-aminovaleric anhydride, N-carboxy-alpha-aminocapric anhydride, N-carboxy-alpha-aminolauric anhydride, N-carboxy-N-phenylglycine anhydride, and N-carboxy-sarcosine anhydride only N-carboxy-DL-alanine anhydride was found to confer unshrinkable properties on wool so that so far anhydrocarboxyglycine is the most satisfactory anti-felting agent of this type available.

Alexander, Bailey and Carter also sought an explanation of the way in which anhydrocarboxyglycine is able to make wool resistant to felting and shrinkage and it would seem from their results that the explanation given by Baldwin, Barr and Speakman (supra) may not be correct. In these new investigations it was found that treated yarns become stronger while the individual fibres composing them suffered a slight loss of tensile strength —this would support the view that there is a considerable amount of gluing together of the fibres in the yarn to give it its extra dry strength. Again, measurements of the loss of scaliness by the treated wool fibres vary considerably as for example, 40%, 50%, and 22% and are difficult to interpret. On the other hand, the wool gains in weight and may lose softness if incorrectly processed. Thus the explanation now given is that the loss of felting power (shrinkability) is due partly to a small reduction of scaliness coupled with some gluing together of the fibres by the polymerised anhydrocarboxyglycine. This latter effect would explain the increased resistance to wear following the anhydrocarboxyglycine treatment.

It is interesting to mention that two alternatives to anhydrocarboxyglycine were prepared and examined as regards their behaviour towards wool. They were 3:4-dihydro-dithiazole-5-one and 2-thio-5-oxazolidone having the formula set out in Fig. 4. No

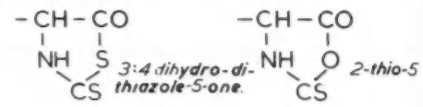
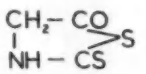


Fig. 4

insoluble polymer could be prepared from the first, but the latter could be induced to leave a polymer on wool by application of its solution in diethyl carbonate and the maximum reduction of shrinkage then obtained was only 25% of normal shrinkage. These compounds were considered of no value for making wool unshrinkable.

At this stage it is convenient to turn to the latest development in this field, that is, the publication of the results of an attempt by Bradbury and Leeder (J. Text. Research, 1960, **30**, 118) to establish an unshrinkable process for wool involving the use of thiazolid-2:5-dione having the formula shown in Fig. 5. It is an unstable

Fig. 5



substance which polymerises in the presence of water and it is under conditions where a suitable amount of water is present that this thiazolid-2:5-dione can be applied to wool.

After many experiments it was found that the most satisfactory conditions for applying this substance to wool are when 4 parts of wool fabric are immersed for 60 mins. in an intermittently stirred solution of 0·2 parts of the dione in 100 parts of white spirit containing 2% of n-butyl alcohol (equivalent in its polymerising effect

to water) at 60°C. The wool should be conditioned to 12 to 14% moisture content before the treatment and it is curious that this is the optimum moisture content for wool which in an air-dry condition is subjected to those unshrinkable processes which use a 2% solution of sulphuryl chloride in white spirit or a 0·6% solution of caustic soda in 9/1 mixture of white spirit and n-butyl alcohol. Instead of n-butyl alcohol it is possible to use ethyl alcohol—obviously the hydroxyl groups present in ethyl and butyl alcohols favour the polymerisation of the thiazolid-2:5-dione in much the same way as does water.

Wool fabric made substantially unshrinkable by treatment with thiazolid-2:5-dione as described above has about twice the resistance to abrasion as untreated fabric and this wear value appears to be lower than that of fabric made unshrinkable by treatment with anhydrocarboxyglycine. The effect of the dione on the wool fibre surface has been shown to increase the roughness in both the root-to-tip and tip-to-root directions but unequally so that the difference of the frictions in the two directions is left smaller than before the treatment—such an equalisation of friction values is well known to favour resistance to felting.

From what has been stated, wool can evidently be made substantially unshrinkable by application of anhydrocarboxyglycine or thiazolid-2:5-dione in an organic solvent containing a small proportion of water or equivalent substance such as ethyl or butyl alcohol to give conditions whereby a polymer is produced in the wool. Such a method of making wool unshrinkable has the great advantage of leaving the wool with two to three times its original wear resistance and in this it differs fundamentally from those widely employed methods based on the use of a hypochlorite. Unfortunately, the cost of using a process depending on anhydrocarboxyglycine or thiazolid-2:5-dione is high so that it cannot be contemplated at present. Investigations in this field, however, suggest that if costs could be reduced the method would be preferable to others.

For reasons not yet completely explained this method of securing an unshrinkable finish on wool goods by deposition of a polymer in or on the fibres requires but one tenth of the amount of polymer necessary with processes such as those using methylol derivatives of melamine. Thus this method enables unshrinkable wool to be obtained by a resin treatment yet without appreciably affecting the soft handle of the wool. This important point suggests that further investigation would be well worth while.

Baldwin, Barr and Speakman (supra) inclined to the view that the polymerised anhydrocarboxyglycine behaves so efficiently in producing an anti-felting finish because the polymer chemically combines with the wool fibres by reaction with the end amino groups of their lysine content. However, Bradbury and Leeder disagree with this and produce considerable experimental evidence to support their view. These workers consider it is the moisture present in the wool and in the organic solvent which initiates the polymerisation of anhydrocarboxyglycine and they believe the resulting polymer is deposited on and inside the epithelial scales of the fibres thus reducing the difference in the roughness in the root-to-tip and tip-to-root directions so that the felting power is correspondingly reduced.

Modification of Washing Liquid

While investigations are being carried out in the direction of making wool shrink resistant by application to it of resins or chemicals which can so change the composition of the fibres that they no longer show a tendency to felt the problem of being able to wash ordinary wool materials without shrinkage (arising from felting) is also being tackled from another viewpoint—modification of the washing liquid medium so that it hinders felting. This latter field of investigation is interesting and may in the future lead to particularly useful results. Such investigations have no doubt followed earlier disclosures that wool materials do not felt when washed in organic solvents of a non-polar type such as benzene, paraffin, and petroleum fractions.

A recent communication by Graham and Statham (J. Text. Res., 1960, **30**, 151) dealing with the retarding effect of the presence of calcium chloride and zinc sulphate in aqueous washing liquors applied to wool materials gives considerable information on this special effect of electrolytes, first noticed some ten years ago in America. So far it has not proved possible to apply the results obtained to the commercial cleaning of wool but the results are throwing light on the way in which the frictional and resilient properties play a part in felting processes.

Early work in this field by Bogaty, Sookne and Harris (J. Text. Research, 1951, **21**, 822) involved tumbling wool in top form in solutions of various electrolytes with and without the presence of an acid. Among the substances present in these solutions were sodium and potassium chlorides, calcium chloride, lithium bromide, and formic, hydrochloric and sulphuric acids. After such treatment under closely controlled conditions measurement was made of the resulting wool shrinkages. Measurements were also made of the frictional and resilient

Table 1

Aqueous Liquor	% Wool Shrinkage	†Relative Fibre Dia.	‡Relative Work for 20% Extension of Fibre	*Fibre Resilience
Pure water	47	1·00	1·00	0·49
4M. KCl	34	0·98	1·14	0·38
1M. NaCl	46	—	1·03	0·45
5M. NaCl	34	0·96	1·25	0·35
Saturated NaC_2	26	—	1·30	0·32
1·6M. $CaCl_2$	39	0·96	1·25	0·40
3M. $CaCl_2$	13	—	—	—
0·1M. HC_2	52	1·03	—	—
2% HCOOH	54	1·03	0·72	0·66
9% HCOOH	58	1·06	0·67	0·71
20% HCOOH	59	1·08	0·55	0·75
4M. KCl + 0·01M. HCl	27	0·97	0·96	0·33
4M. KCl + 0·1M. HCl	34	0·98	0·91	0·34
5M. NaCl + 0·01M. HCl	20	0·95	1·18	0·24
3M. NaCl + 0·01M. HCl	34	—	—	—
Sat. NaCl + 0·1M. HCl	19	—	1·10	0·24
Sat. NaCl + 0·1M. Acetic acid	21	—	—	—
Sat. NaCl + 0·05M. H_2SO_4	21	—	—	—
99% Iso-propyl alcohol	8	0·86	Fibres broke before attaining 20% extension	—
84% Iso-propyl alcohol	37	—	1·33	0·31
49% Iso-propyl alcohol	54	1·03	1·05	0·48

* Indicates ratio of work recovered to that required for 20% extension in aqueous solution.
† Indicates ratio of fibre diameter in the aqueous solution to that in water.
‡ Indicates ratio of work to extend fibre 20% in aqueous solution to that required in water.

properties of the wool fibres in water and also in the solutions in which the wool top samples were tumbled—the corresponding fibre swellings in these liquids were determined at the same time. Thus an attempt could be made to correlate the felting behaviour in the electrolyte solutions with these other properties of the wool.

The results showed that many of the electrolytes (neutral salts such as sodium and potassium chloride) depress the felting of the wool in proportion to the concentration of salt present. Compared on the basis of molarity calcium chloride has a greater depressing effect than sodium chloride. Felting was also found to be depressed with iso-propyl alcohol solutions and in proportion to their content of this alcohol. It would seem that in such aqueous solutions the wool acts as if it is in a relatively drier medium than in water. Thus the reduced power of the wool to felt in such solutions is also evident when wool is washed in dry cleaning solvents and is comparable to the lower feltability of dry wool. It is interesting also to note that the acidification of an electrolyte solution can markedly depress the feltability of wool.

It was found that in these electrolyte solutions wool fibres swelled less than in water so that the fibres behave more stiffly and require a greater force to extend them in length. Some data obtained are given in Table 1.

With the aid of such data as those given above it is possible to construct curves (see Figs. 6, 7, and 8) showing the relationship between the felting of the wool top and (*a*) the swelling of the fibres in the various aqueous solutions, (*b*) the relative work for extension of the fibres in the same liquors and (*c*) the resilience of the fibres in these liquors. There is evidently a close relationship between the felting power of wool top and the resilience of the fibres in these various electrolyte solutions—as the resilience increases so does the power of the wool to felt. It is obviously possible to predict the felting power from a knowledge of the wool resilience in any aqueous electrolyte solution.

Table 2

	Felting Shrinkage	Relative Work for 20% Extension of Fibres	Fibre Resilience
Wool dyed to saturation ..	32%	1·95	0·21
Untreated wool	49	—	0·62

Note: The dyeing was effected in 0·1M. HCl and all the fibre and felting shrinkage measurements were made in 0·1M. HC_2.

Table 3

Temperature of Felting	% Shrinkage of Wool Fabric after Washing for ½ hour	
	$CaCl_2$ present	$CaCl_2$ absent
17°C.	0·2	18
31°C.	0·2	27
42°C.	1·8	37
50°C.	5·6	35
56°C.	8·1	34
73°C.	9·8	32
86°C.	9·9	32
93°C.	29·5	32

Note: The calcium chloride solution contained 48 grams of anhydrous salt and 1 gram of glacial acetic acid per 100 c.c. of solution.

Generally the results indicate that treatments which give wool rubber-like characteristics and increased resilience have the effect also of increasing its felting power—it would seem that this underlies the efficacy of milling wool under acid conditions.

Effects of Dyeing

It may here be recalled that Liu, Speakman, and King (J. Soc. Dyers and Col., 1939, **55**, 183) showed that dyeing wool fibres to saturation point could decrease their resilience and feltability. This is in accordance with the observations made above. Thus it is interesting to note that Bogaty, Sookne and Harris have carried out a similar experiment to confirm this special effect of dyeing. They saturated wool with the acid dye Orange II and with it obtained the data in Table 2.

The effect of dyeing wool with a large amount of dye appears to give the fibres a lower resilience comparable to that produced by an electrolyte solution so that the dyed wool felts more slowly or to a less degree. Thus, however, the change is effected—by use of an appropriate liquid medium or by saturating the wool fibres with a dye—a lowering of the resilience of fibres leads to diminished felting.

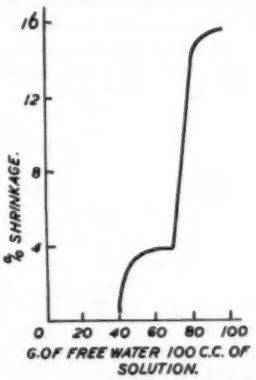


Fig. 9. The diminished felting shrinkage of wool fabric in conc. aqueous solutions of calcium chloride and zinc sulphate

Having in mind these earlier researches of Bogaty, Sookne and Harris it is now useful to turn to recent investigations of Graham and Statham (J. Text. Res., 1960, **30**, 151). This recent work is concerned more particularly with the felting of wool fabric in aqueous solutions of calcium chloride and zinc sulphate, it being found that the wool felts less as the "free' water content of the solution is lower.

Calcium chloride and zinc sulphate can exist as hydrated salts having the formula, $CaCl_4.6H_2O$ and

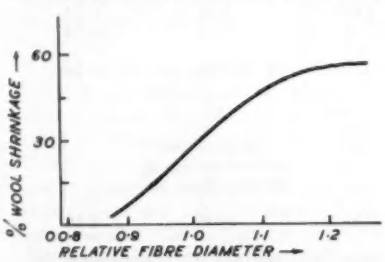


Fig. 6. The relationship between felting shrinkage and swelling of wool fibres in aqueous electrolyte solutions. Fibre diameter in water = 1·0

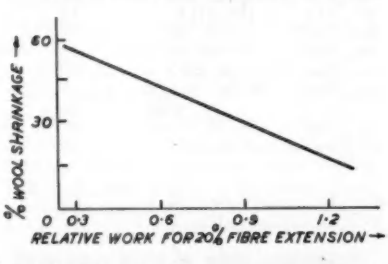


Fig. 7. Curve showing relationships between felting shrinkage and the relative work required to extend wool fibres 20% in aqueous electrolyte solutions. Relative work in pure water = 1·00

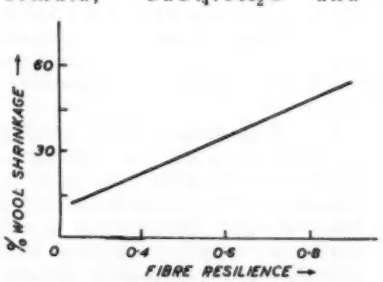


Fig. 8. The relationship between felting shrinkage and the resilience of wool fibres in aqueous electrolyte solutions. Resilience of wool fibre in water = 0·49

$ZnSO_4.7H_2O$ respectively. When these salts in anhydrous form are added to water it can be assumed they add on water and so reduce the amount of "free" water. In Fig. 9 a curve is shown which holds for both calcium chloride and zinc sulphate—it indicates how the felting of wool fabric is hindered by the presence of these salts (felting was carried out at 25°C. for 30 mins. in a washing machine).

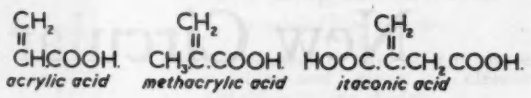
The temperature of the liquor in which felting takes place has a definite influence on the degree of felting produced and so the data in Table 3 is given to show how the temperature effect differs with and without the presence of calcium chloride in the felting liquor.

The curve in Fig. 9 shows how considerably felting can be depressed by the presence of calcium chloride and zinc sulphate—felting may actually be entirely prevented while in pure water the wool shrinks about 15%. Striking too, is the effect of temperature on the felting of wool in aqueous calcium chloride solution. Shrinkage commences at some temperature above 31°C. and becomes more definite at 50°C. and above this. But at about 93°C. the wool shrinks in the ordinary manner as though no calcium chloride is present. These recent investigations of Graham and Statham show that for wool to felt in aqueous solutions of inorganic salts capable of hydration it is necessary that there should be 70 to 80% of free water after allowing for the water which can be assumed to have combined with the inorganic salt present.

The conclusion must be drawn that the felting of ordinary wool in aqueous salt solutions is primarily governed by the degree to which the elastic (resilience) properties of the wool are changed by immersion in the salt solution. When wool is chemically treated to make it unshrinkable, measurement of the roughness of the fibres has shown that the felting behaviour in aqueous liquors free from electrolytes is primarily due to the increased smoothness of the fibres. Obviously, both resilience and surface roughness can play an important part and it would, therefore, be worth while to investigate further to ascertain how these two factors are related.

Modification of the felting power of wool by application of polymers and resins is as yet incompletely understood since it does not seem possible to predict whether or not any particular resin will be effective. The relative ineffectiveness of ordinary methylol derivatives of urea and melamine compared with their corresponding etherified methylols can be cited to illustrate this point but there are others. Recently, Rohm and Haas Co. (B.P. 801,987) unexpectedly discovered that certain copolymers containing 4-vinylpyridine can be effective anti-felting agents and treated wool material can be washed in a soap liquor at 140°F. in a washing machine for the prolonged period of 5 hours without appreciable shrinkage—the corresponding copolymers prepared with other vinylpyridines such as 2-vinyl-, 2-methyl-5-vinyl-, and 5-methyl-2-vinyl- pyridines have been found to be practically without effect on the felting power of wool.

Fig. 10



The particular copolymers of this kind recommended for application to wool materials are made by an aqueous emulsion process using a mixture of one or more ethylenically unsaturated copolymerisable compounds especially an ester or acrylic, methacrylic, or itaconic acid with an alcohol having an alkyl group of 1 to 18 carbon atoms. The resulting copolymer should contain 3 to 15% of the 4-vinylpyridine. It is believed that under the conditions recommended for applying the copolymer to wool materials it chemically combines with the fibres and does not simply coat them—support for this is found in the fact that in prolonged wet washing or dry cleaning no loss of copolymer can be observed.

The three unsaturated acids mentioned have the formula shown in Fig. 10 and it is the esters of these acids which are used. Thus the ester may be made from a lower alcohol such as ethyl or butyl alcohol, or from a higher alcohol such as lauryl or stearyl alcohol. It has been found that if the wool is to be left with the maximum softness of handle after treatment use should be made of those esters formed with higher alcohols. However, very satisfactory results may be obtained with say a copolymer containing 5% of 4-vinylpyridine and 95% of n-butyl acrylate. Since these copolymers are water-insoluble they applied to the wool from an aqueous dispersion. It has been found that if the copolymer is prepared so as to contain also a small proportion of the free acid then the dispersing power of the copolymer is improved. To secure such a copolymer there may be added this small proportion of free acrylic or other acid to the polymerising mixture or the copolymer itself may be partly hydrolysed by treatment with a hot alkaline solution to form the free acid and free alcohol. It has been found that instead of the particular copolymer mentioned it is better to use one containing 5% of 4-vinylpyridine, 93% of n-butyl acrylate, and 2% of acrylic acid.

To produce non-felting and non-shrinking wool a liquor containing up to 10% of the copolymer and optionally a small proportion of an acid catalyst is used to impregnate the wool. Thereafter the wool is dried and then cured at 300°F. for 10 mins. After washing out residual chemicals the wool is left with its original soft handle, a somewhat higher resistance to abrasion, and reduced felting properties, such that it shows a zero shrinkage after washing in soap at 140°F. for 5 hours. It is believed that wool materials so treated could be claimed to have wash-and-wear characteristics similar to those of nylon.

New Type Card Clothing Grinding Machine

Messrs. Prayon de Pauw, Ghent, Belgium, stated to be one of the leading card clothing manufacturers in Europe, have had a specially constructed grinding machine built for them by Dronsfield Brothers, Atlas Works, Oldham. This new machine, fully automatic and completely electrically controlled on a relay system, is claimed to incorporate many unique features designed to produce the ideal point in the grinding of card clothing.

* * *

Tricel Fabric Fair

A Tricel Fabric Fair is to be held at Celanese House, 22 Hanover Square, London, W.1, September 19 to 24. Over 100 exhibitors will be displaying extensive examples of knitted and woven fabrics in their commercial ranges for Spring 1961. In addition, there will be on view a collection of entirely new Tricel development fabrics. Dryers and finishers will also be illustrating the many achievements which have taken place in this field during the past year.

Of particular interest will be examples of developments in printing and finishing, produced in co-operation with dyers and finishers. There will be a section set aside with a pleating machine in operation and a display of pleated fabrics illustrating the variety of pleats available. Also, a separate section for the Tricel labelling scheme and advertising.

New Circular Loom to be Built in Britain

Details of a new development which, if eight shuttles are employed running at 40 r.p.m., will run for 60 mins. continuously. Each warp thread is individually tensioned

By SEFTON S. SAMUELS, A.T.I.

A FIFTY-YEAR OLD Belgium lawyer, Monsieur J. Dautricourt, gave up his practice 14 years ago to devote his life to designing a circular weaving machine, strangely similar in appearance to a small Hovercraft and claimed to be capable of weaving over half the cloths produced by conventional methods, ranging from coarse to very fine, and at a rate several times greater than any known existing machinery.

This new loom offers exciting prospects in that its extreme versatility might well have far reaching effects on the cotton, jute, man-made fibre, linen, asbestos and even wool sections of the industry.

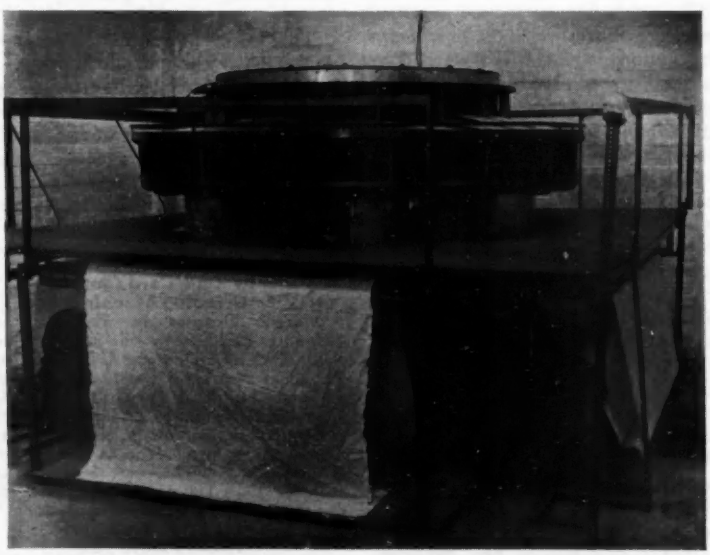
The bachelor inventor, originally a practising lawyer in Zeebruges, first became interested in circular weaving through the influence of his brother, a textile consultant, who was assigned the task of developing a circular loom in 6 months by a Belgium jute manufacturer. He learnt of the many difficulties encountered by his brother and gradually became more interested until, obsessed by the challenge he eventually gave up his practice to devote all his time and energy to the work.

Theoretically, circular is the idcal principle and there have been several such looms produced but, as yet, none has been considered completely satisfactory and most are limited in their diversity. However, after 2,000 years of flat weaving, this new machine appears to have overcome most of the previous difficulties and four such looms have been working on a commercial basis (double shift) in a Belgium cotton and jute mill for the past four years. During that time it is claimed that not a single component needed replacement and conventional oiling has also been eliminated.

After the Suez crisis the mill received a large order for refugee blankets from U.N.O., and these were woven on the Dautricourt looms which, it is said, are capable of weaving yarns made from almost any fibre and cloths of almost any construction from the flimsiest to heavily built sailcloths and in most of the common designs. Cotton sheeting and sailcloths inspected appeared to be well up to maximum sett and evenly woven. Some other fabrics on view were composed of a medium quality cotton warp together with a weft of low count, in cotton condenser or bump type and also woollen, and containing little twist of strength; several of these had been raised in finishing.

For asbestos and jute weaving packages of up to 7 lbs. are the standard procedure and a specially fitted suction device removes fly and dust which is drawn *through* the cloth, thus keeping the atmosphere clear around the loom as well as adding to the weight of the cloth. The cloth is woven in a circular fashion and several widths of normal size can be woven together which are then separated before coming from the loom. A strong leno selvedge, put on during weaving, is adequate for finishing purposes.

Up to eight shuttles can be used revolving at 40 r.p.m. and giving approximately 60 mins. continuous weaving. A light flashes when any warp or weft thread breaks indicating its position and stopping the loom instantaneously. Each warp yarn is individually tensioned which allows for maximum strain during shedding and beat-up and also compensates for any tension differences which may arise due to variations in yarn length from warp beam to healds and cloth fell around the machine. Normal warp beams are used and looming is said to take place as easily and quickly as on a conventional loom. Many novel features in loom construction are incorporated in this new circular weaving machine.



General view of the Dautricourt circular loom which can use up to 8 shuttles

Monsieur J. Dautricourt, the inventor of the new circular loom

Quiet Operation

In tackling the task, Monsieur Dautricourt made a detailed study of many ancillary subjects concerning metals, alloys, plastics, fibre glass as well as the spinning processes and yarn characteristics of various textile fibres, warping, weaving and finishing methods and general engineering. The loom stands 7 ft. high and the weaver works on a platform four feet above the ground. It runs quietly and smoothly and simplicity of design and operation enables a weaver to be quickly trained, one weaver attending 4 - 6 looms. Due to this smoothness in running and slight yarn tension many faults such as reediness, weft bars, and thread breakages are reduced. Much weaker yarns are also weavable and this is especially useful in the weft. Mending is therefore cheaper and quality improved.

Although primarily intended for plain and semi-plain manufacture simple designs and colour effects are possible including, it is reported, pick and pick. The standard loom is capable of weaving designs up to six shafts and the wefting is arranged by the use of all or fewer of the eight shuttles, e.g., using five shuttles for a design requiring four picks of colour A followed by one pick of colour B. These machines can be made to the manufacturer's own specifications and the number of heald shafts and circumference of the machine increased if required. The only restriction on the size of the latter (200 ins.) is at present due to the difficulty of transport but this, no doubt, will soon be overcome. The increased production potential should interest weavers of asbestos and jute (reduction of fly by special suction device), man-made fibres (reduction of tight threads), and blankets (much larger weft packages).

After the inventor had turned down a German firm's demand for the world rights Mr. B. Whitehead (managing director, Safety Research Services Ltd.), went to Belgium and obtained the rights for his firm. Plans have now been formulated for production by a Northern machinery maker and the first of the new models is expected to appear in 8 - 9 months' time. Meanwhile, the original prototype is now be running and on view to prospective trade buyers in a Hebden Bridge mill. Much interest has already been shown by the larger producers in Lancashire and Yorkshire. The cost per machine is approximately £3,500.

Patterning Attachment

(*continued from page 301*)

(3) The control of the yarn is more positive and gives a clearer definition to the design.
(4) The Mohasco attachment is much easier to rethread in the event of yarn breakage.
(5) The attachment can be changed from say a $\frac{1}{8}$ in. gauge to a $\frac{1}{4}$ in. gauge merely by changing the pattern and idler slats and the pitch of the yarn guide bar.
(6) Maintenance costs are negligible.

British Tufting Machinery Ltd. are now building the new unit at their recently extended factory at Whitebirk Drive, Blackburn. They do not plan to sell the attachments, but will license manufacturers to use them on a rental basis, details of which will be supplied upon application. Standard units for producing high and low loop pile patterned tufted carpet can be fitted to all existing B.T.M. machines or supplied with completely new machines as an integral unit.

The unit can also be used to produce combined cut and loop pile carpeting, but for this it is necessary to modify the frames of existing machines. Finally it is possible to produce high cut and low loop pile carpet which is of the sculptured type. Patterning on this machine is extremely simple and all the two-colour effects obtainable on other machines can easily be produced by the normal technique of tufting alternate rows of contrasting colours and using one colour first to conceal a low loop of the other and then vice versa. This is particularly effective with loop pile, when the high loops spread very well over the very low adjacent loops. This machine is a significant addition to the comprehensive range of B.T.M. tufting machines which now cover every aspect of the tufted carpet trade. Not only is a full range of tufting machinery now built by the firm, but also a complete range of ancillary equipment.

Warner Memorial Medal

The Warner Memorial medal has been awarded to Professor C. S. Whewell, B.Sc., Ph.D., F.R.I.C., F.T.I., F.S.D.C., Professor of Textile Technology, Department of Textile Industries, Leeds University. The medal is awarded in recognition of outstanding work in textile science and technology, the results of which have been published, and particularly for work published in the Journal of the Textile Institute.

* * *

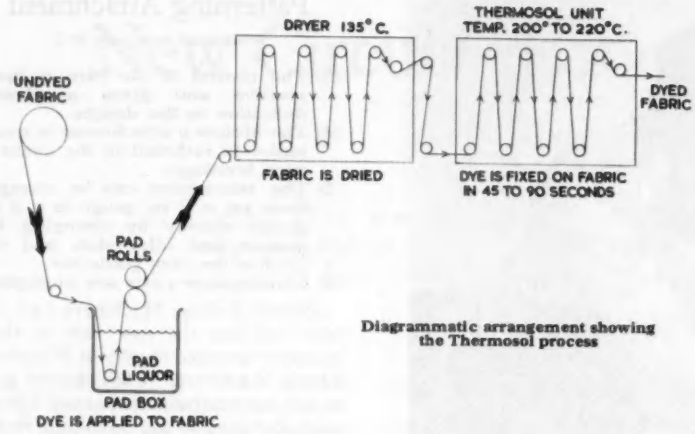
Uganda Cotton Crop

Barclays Bank D.C.O. report that practically all the 1959-60 crop has been sold and, subject to adjustments still to be made, has yielded 325,542 bales of first-grade cotton and 32,939 bales of second grade. The Bank adds that although production was 42,500 bales less than the 1958-59 season it has earned the country about £2 million more, due to higher prices realised.

* * *

Heating, etc. Units

Speedyheat Ltd., 44 Tower Hill, London, E.C.3, manufacturers of space heating and air circulating units, have widened their interests. They are now the London Office of Burgess and Co. (Engineers) Ltd., makers of the "Burgess" boiler for hot water and steam. In addition, they are authorised agents for the "Bekon" range of pressed steel radiators for high and low pressures.



Diagrammatic arrangement showing the Thermosol process

The Thermosol Process

DEVELOPED especially for dyeing "Dacron," the Thermosol process (U.S. Patents Nos. 2,663,612 and 2,663,613) is a relatively simple continuous method of applying disperse and vat dyes to large yardages of fabric. It is said to have proved especially useful in dyeing blends of "Dacron" and cotton, where the volume of fabric to be treated is large enough to justify the cost of equipment involved. In this process, fabric is padded with a solution or dispersion of the dye, dried, and subjected to heat treatment at temperatures from 200° to 220°C. for 45 to 90 secs. The dry heat causes the padded dye to penetrate rapidly into the fibre.

Equipment required for dyeing by the Thermosol process is readily available in many mills. A good padder is needed and a roller-type oven in which temperatures of 204° to 232°C. can be attained for the actual dye fixation or Thermosol step. Dry cans or preferably a flue dryer can be used for drying the fabric after padding. Radiant heat pre-dryers may be beneficial in controlling migration. Uniform disposition of heat and balanced air flow are very important factors to be considered in the drying step to control cross shading or back to face shading of the padded material.

Disperse dyes, such as du Pont's "Latyl" dyes, applied to "Dacron" by the Thermosol process, provide a range of shades with good colour value and good fastness. An important factor in the process is the high degree of disperse dye utilisation. Generally, in a blend of "Dacron" with 35% cotton, 75 to 90% of the originally padded dye is fixed on the "Dacron" by the heat treatment due to migration of the disperse dye from cotton to "Dacron."

Certain vat dyes are fixed on "Dacron" polyester fibre by the Thermosol process. Selection of those which produce fairly good unions on "Dacron" and cotton and which have adequate fastness properties offer the advantage of only one padding operation in dyeing "Dacron"/cotton blends. In the Thermosol operation, a portion of the vat dye is fixed on the "Dacron" and the remaining portion is then fixed on the cotton by conventional batch or continuous processes.

Disperse and vat dyes also can be padded together on "Dacron"/cotton blends from the same bath and the fabric dried and subjected to the Thermosol procedure. While this is advantageous from the standpoint of requiring only one padding operation, shade control may be a problem because some of the vat dye will be fixed on the "Dacron" during the Thermosol step. This requires careful choice of vat dyes which, while supplementing the shade of disperse dyes on "Dacron," will, upon reduction, give the desired union effect on the cotton in the blend. This method has been used successfully in making an attractive range of light to medium shades.

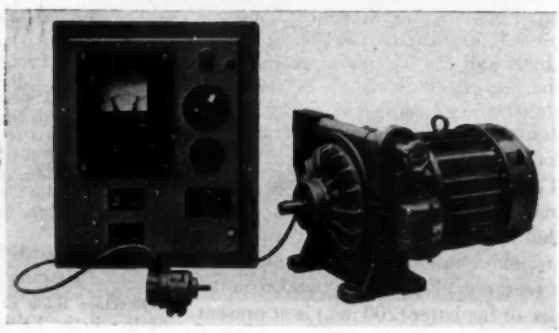
In the production of medium to heavy shades with disperse and vat dyes, it is necessary to have more uniformity of shade between the "Dacron" and the cotton in the blend. Most suitable procedure developed so far is to apply the disperse dyes to the "Dacron" by the Thermosol process and then dye the cotton by conventional batch or continuous procedures. This approach, involving two separate padding and dyeing operations, offers maximum shade control and has an additional advantage in that the dyeing procedure for the cotton is an effective scour for removing disperse dye stain from the cotton, particularly in batch operations.

Disperse and fibre-reactive dyes applied simultaneously offer another possibility for dyeing both the "Dacron" and the cotton in one operation. In this application, disperse and fibre-reactive dyes are applied to their respective fibres by the combined Thermosol and thermofix procedures. Encouraging results have been obtained in du Pont's laboratory and in mill dyeing, especially in light to medium shades using lower concentrations of urea and soda ash followed by normal Thermosol treatment of the fabric. Disperse dyes should be selected carefully since the alkaline pad bath causes certain dyes to speck, du Pont dye technologists point out, adding that at least 11 "Latyl" dyes, ranging from yellow to brilliant blue, have been determined to be suitable for use in the alkali, urea, fibre-reactive system with up to 20 grams per litre of sodium carbonate.

New Speed Control Unit

THE prototype of a very efficient speed corrector unit recently announced by Allspeeds Ltd., Oakenshaw Works, Clayton-le-Moors, Accrington, has already aroused considerable interest. It is a "package" type unit specially designed to automatically adjust a varying speed so as to obtain a final constant linear or rotary speed. A good example is the maintenance of a constant linear speed when winding any material on to a driven drum which would normally increase the linear speed due to the build-up of the material on the drum.

The unit is fully automatic and will operate over the full range of standard Kopp variable speed gears. The speed selected to suit the material or process is set on the dial control and maintained to within 1% to 5% depending on the customers' requirements. Provision can be made for an over-riding switch to give manual control and inching stations for pre-setting purposes so that speeds for new materials or processes may be obtained. The complete speed corrector unit is totally enclosed in a cabinet suitable for panel or wall mounting.



The new speed corrector unit made by Allspeeds Ltd.

Reviews

TIME STUDY MANUAL FOR THE TEXTILE INDUSTRY. Textile Book Publishers Inc., U.S.A., Interscience Publishers Ltd., 88-90 Chancery Lane, London, W.C.2 (price 49s.).

The manual represents the work of twenty-seven contributors with a background of practical experience, and has been edited by Norbert L. Errick. The historical background of time and motion study is reviewed briefly, leading on to the activities of the modern standards department. The job description of staff and typical card and spinning room labour is reviewed and methods of classification discussed. Some details are given of methods of standardising production methods, followed by preparation proceedings, tools employed, performance rating, allowances, and computation of standards and the validity of the calculated standards. Three chapters are devoted to the importance of, and methods suggested for selling the standards to management, supervisors, and operatives, followed by a brief discussion of short- and long-term "follow up" on accepted standards.

The conception of the unions affect on time study is probably more true in the U.S.A. than the U.K., but the outline of wage payment methods for incentive programmes is interesting and well written. A chapter is devoted to simple case histories, and a final chapter is devoted to the time study engineers' guide to statistical quantity control. The book can be recommended for beginners to form an appreciation of time study procedure and problems, and could be read with distinct advantage by many senior technical staff members. Time study officers with considerable experience will vary little in this excellent work with which they are not already acquainted.

J.D.

* * *

EFFICIENCY AND PRODUCTIVITY TABLES FOR TEXTILE MACHINE OPERATION. Thomas F. O'Connor.

The series of tables are built up from three main factors, the cycle ratio (average time spent by the operator on stops per M.R.H.—machine running hour), the number of similar semi-automatic machines in a battery, and the productivity factor. By semi-automatic, it is meant that, once loaded, the machine can run and produce unattended, but at intervals which are random, stops occur which call for extra work by the operator, e.g., speedframes. The productivity factor is the average number of M.R.H. expected per hour from the battery of machines, on the assumption that the operator services the stops at random, and the loss due to machine interference has been taken into account.

The values of A, the productivity factor, has been calculated from Ashcroft's formula—

$$A = (NY)/(1 + PNY)$$

Where N is the number of machines in the battery, Y is the number of stops which have to be serviced in the interval between two consecutive spells of all machines running, and P is the cycle ratio in decimal hours.

The tabular arrangement lists in three columns for each value of P and N:—

(1) The corresponding values of the productivity factor A.
(2) The machine efficiency A/N.
(3) PA which is the fraction of each hour on the average during which the operator is busy on stop.

For each listed value of P, N has been carried to the point where the value of PA is about 0·990.

A detailed and clear explanation is supplied of the basic procedure, and the time study allowances required in order to use the tables, and several detailed illustrative examples are given in the several uses of the tables. The manual is an extremely useful tool for the time study engineer. The tables have been calculated on an I.B.M. 650 electric computer, at the North Carolina State College, which checked the authors original tabulations made on a desk calculator, so the accuracy of the tables should be assured. In view of the above precautions, it is surprising to find an error in the legend for one graph giving labour, overhead, and total cost; in an example showing the effect of increasing machine assignments to drawframe tenters.

J.D.

* * *

APPRETUR DER TEXTILIEN. By W. Bernard. Springer-Verlag, Heidelberger Platz 3, West Berlin, Germany. 1960 (price 60s.).

This book, with the sub-title: mechanical and chemical technology of textile finishing, describes all, ancient and modern, methods to improve the attractiveness and/or serviceability of textiles. The volume is divided into three parts and deals first with the mechanical methods (cleaning, singeing, desizing, cropping, milling, drying, raising, mangling, compressive shrinking, pleating, etc.). Each process is explained with good illustrations of finishing machines used. The second part gives a description of chemical finishing methods comprising starch fillers and stiffeners, weighting finishes, softeners, protective agents, non-shrink finishes for wool, methods to render materials water-, flame- and rot resistant and water-proofing, delustering, coating and doubling of fabrics. There is also a detailed account of high-class finishes, crease-resisting processes, the theoretical basis of such processes and their practical application. The misprint (p. 277): Tootal Broadhurst Lee, as the inventor of the crease-resistance process, should be corrected in the next edition.

The last part of the book contains practical recipes for the production of bed-linen, ladies' underwear and stockings, gloves, minimum-care, no-iron, rapid-iron and other modern finishes. The bibliography at the end of the book could be augmented and to the list of journals and periodicals: J.S.D.C., J.T.I., "Textile Manufacturer" and other British journals should be added. The book is well written and contains useful practical hints. The wide- and ever-widening field of textile finishing is not only fashionable and practicable, and chemical scientists and manufacturers enable the textile producer to improve, adorn and embellish his goods to a degree unforeseen and unpredictable heretofore.

B.S.

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DIRECTORY OF OPPORTUNITIES FOR SCHOOL LEAVERS, 1960. Cornmarket Press Ltd., 1 Lower James Street, London, W.1 (price 8s. 6d.).

The total number of entries in this well-established careers guide has increased to 165, a rise of nearly 25% over 1959. The editorial articles, valuable to school leaver and easy to read, contain advice by experts on self-assessment for suitable careers, a concise guide to university entrance requirements, careers in the professions, technical training and apprenticeship and opportunities for girls in industry. The reference section sets out in detail information on commercial, industrial and government organisations, together with prospects for advancement in such employment, and the classified index summarises in tabular form further information about the size of organisations, whether boys or girls are employed and the areas in which employment is offered.

* * *

YORKSHIRE TEXTILE INDUSTRY. John Worrall Ltd., Central Works, Oldham (price 30s.).

The arrangement of material and thorough indexing make this 75th edition quite simple to use, the inclusion of a complete alphabetical index to firms having descriptive editorial entries being a valuable and time-saving innovation. The volume contains roughly 600 pages, covering not only yarn and cloth producers and processors but also suppliers of machinery, chemicals and raw materials used in the industry. Details of educational, research testing and marketing organisations are given in the commercial and education sections and the statistical section contains tables relating to consumption, production and stocks of wool and other fibres, yarns and fabrics.

S.P.S.

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MANCHESTER ROYAL EXCHANGE DIRECTORY.—Richard Collinson Ltd., 15 Cross Street, Manchester 2 (price 42s. net).

The sixty-fifth edition of this valuable reference work, concerning the business activities of members and firms represented on "Change," maintains its high reputation for concise information, easy to find and in compact form. In addition to lists of firms represented and members, there is a classification of cotton spinners and manufacturers, tests of cotton and rayon doublers, waste spinners and manufacturers, and a list of manufactured goods. Holiday dates in the cotton towns are, as usual, included, also a classification in towns of cotton spinners and manufacturers, doublers, bleachers, dyers and finishers. A considerable amount of other essential information makes this well-produced book an asset in any textile company office and to all directly or indirectly connected with this important trade.

A.D.

Technical Literature

EPOK PVA EMULSIONS. A new technical booklet which describes Epok PVA Emulsions, has recently been published by British Resin Products Ltd., Devonshire House, Piccadilly, London, W.1.

The booklet is divided into three sections: (i) A description of each emulsion on the Epok range, (ii) The properties of Epok Emulsions, and (iii) The applications of Epok Emulsions. The Epok range of PVA Emulsions consists of fifteen standard products, nine of which are already plasticised and designed to meet many different requirements. Together with paint formulation. Epok Emulsions are employed as adhesives and for carpet making and finishing. Other applications are carpet backing, carpet surface treatment, binders for flooring compositions and textile finishes.

* * *

THE ALLEN WEST STORY. Fifty eventful years of progress and development are traced in the Allen West commemorative presentation edition of their Jubilee publication. Chapters are included on different home and overseas markets, wartime efforts, and post-war progress, together with details of welfare and training and potential future development. Available from Allen West and Co. Ltd., Brighton 7.

* * *

THE GEON STORY. This superbly produced, profusely illustrated publication explains briefly yet eloquently what Geon is, how it is made, what properties it confers, and what products are made from this well-known member of the vinyl plastics group. Sheeting, coated fabrics, extrusions, mouldings, rigid and cellular products are all illustrated and their uses are seen to be literally legion. P.V.C. has certainly arrived and appears to be here to stay. Available from Distillers Plastics Group, Devonshire House, Piccadilly, London, W.1.

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VANDIKE EMULSIONS. The varnished cover and high quality art paper used in its production immediately convey an impression of quality when handling the new bulletin recently released by British Oxgyen Chemicals Ltd., Bridgewater House, Cleveland Row, St. James's, London, S.W.1. Special sections on Vandike emulsions in textiles, carpet manufacture and non-woven fabrics provide valuable information. Different emulsion grades are supplied in tabular form.

* * *

FILAMENTS. Details of equipment and machinery shown by Warner and Swasey, and Adolph Saurer Ltd., at the Atlantic City Exhibition, are included in the latest Crowther technical review. The latest model Pin Drafters, Pacific Converters and Whirlwind Twisters will be shown by Warner and Swasey, and Adolph Saurer will exhibit a range of their famous looms.

Because this is the centenery year of Arthur Sanderson and Co. Ltd. this issue includes a brief illustrated résumé of the Sanderson Story. Other items are: yarn storage equipment, Crowther truck creel ribbon notes, and lightweight sliver cans.

* * *

ELECTROLYTIC CONDUCTIVITY INSTRUMENTATION. The first of two descriptive booklets published by Electronic Switchgear (London) Ltd., Letchworth, Herts., concerns conductivity cells, of which several types are illustrated. The second deals with the electrolytic conductivity controller type R.C.4 which facilitates continuous automatic electrolytic conductivity measurements and detects and controls solution impurities and concentration changes.

* * *

CHART FOR WRAPPING SHEET CALCULATION. Using the right size sheet when wrapping packages cuts costs by saving materials and labour. To facilitate this, British Cellophane Ltd., Henrietta House, 9 Henrietta Place, London, W.1, have developed a chart to determine the correct size of the film overwrap for a carton. It is accurate, quick and easy to use and will prove invaluable to those with package wrapping problems.

* * *

NEW PACKAGING TECHNIQUES. A new leaflet by British Resin Products Ltd., Devonshire House, Piccadilly, London, W.1, describes the use of Rigidex high density polyethylene in packaging, where the introduction of high density polyethylene has made it possible to provide packs and packaging methods which, it is stated, cannot be achieved as effectively or as economically in other materials.

* * *

INTRODUCTION TO WIGGIN NICKEL ALLOYS. High-nickel alloys can be divided into four categories: corrosion-resistant, heat-resistant, electrical-resistance and materials with special properties. The first part of the publication is devoted to these properties of the alloys, it explains how they are assessed and into which groups the Company's products fall. The latter part illustrates some actual applications of Wiggin high-nickel alloys, showing the wide field of applications found in modern industry. Obtainable free on request from Henry Wiggin and Co. Ltd., Publicity Department, Thames House, Millbank, London, S.W.1.

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STURTEVANT PRODUCTS. Three new publications are available on application to Sturtevant Engineering Co. Ltd., Southern House, Cannon Street, London, E.C.4. They are: No. 3504, "The 'Newgate' Dust Collector"; No. 3505, "Fans for Mechanical Draught," and No. 2304, "Sturtevant Products." The last describes and illustrates fans, heating and ventilation equipment, air-conditioning equipment, dyers and drying systems and other systems of considerable interest.

* * *

RETROFLUX BAG FILTERS. A new folder from W. C. Holmes and Co. Ltd., Gas Cleaning Division, Turnbridge, Huddersfield, introduces "Retroflux" bag filters. These are stated to be eminently suitable for applications where high dust burdens are encountered and/or dusts of an adhesive nature. Advantages claimed for these filters include no friction to ensure long life, continuous cleaning of entire surface area of bag, constant volume of extraction, and low maintenance costs.

COLLOIDAL GRAPHITE. Significant comparisons are drawn between oil lubricated and colloidal graphite lubricated dies in an informative folder available from Graphite Products Ltd., Northfields, Wandsworth Park, London, S.W.18. Pre-treatment of dies is described together with types of dispersions available and methods of application.

* * *

LEVELLING AND PENETRATING AGENTS. A new, attractively set out publication (No. 2159) from Ciba Clayton Ltd., Manchester 11, gives concise information on the general properties, marketed qualities and preparation for use of Albatex PO and PON conc. These highly efficient, anionic agents are used in dyeing cotton and other vegetable fibres, spun and filament viscose and cuprammonium rayon, acetate rayon, polyamide fibres, wool/cellulosic unions with substantive, copperable, vat, sulphur, disperse, union and union fast dyes. The levelling effect is well illustrated on cotton satin and yarn cheeses.

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NEW P.T.F.E./GLASS STOPCOCK. A leaflet announcing the Watson-Marlow P.T.F.E./Glass Stopcock has recently been released by the Loughborough Glass Co. Ltd., Loughborough. Comprising a P.T.F.E. key and Pyrex glass barrel and sidearms, the stopcock is said to be completely free from contamination due to the inert nature of the materials used in the component parts. The key, in particular, has several noteworthy features; it needs no grease and incorporates dimples which deform when the retaining cap is tightened, giving an excellent seal suitable for medium vacuum work.

* * *

PLASTICS SERVE EVERYMAN. The widespread use of plastics in modern life is described in a 12-page illustrated booklet recently published by the Distillers Plastics Group, Devonshire House, Piccadilly, London, W.1. Some of the domestic and industrial applications of synthetic resins and plastics materials are described, together with the special properties which account for the increasing use of plastics in so many fields. The corrosion resistant properties of plastics are given prominence in the sections on pipes and pipelines, the chemical industry and industrial packaging, and sections on the use of plastics in the manufacture of foul-weather clothing and mining equipment complete the publication.

* * *

WORTHWHILE WORK STUDY. The latest "blue booklet" of the Management Consultants' Association is entitled "Making the Most of Work Study." It shows the wide use of work study as the basis for standard costing, budgetary control, and all programme planning. Stating that work study should be planned and introduced with the help of reputable management consultants, the booklet is a useful newcomer to others in this valuable series, e.g. "The Use of Capital," "Preparing for a Computer," "How to Choose a Consultant," etc. All can be obtained gratis from Mr. F. S. Tuffin, Management Consultants Association, 4 London Wall Buildings, E.C.2.

Textile Trade and Prospects

Cotton Yarns and Cloths

Annual holidays in the cotton districts have, as usual, interfered with trade in yarns and cloths. The result will probably lead to more protracted deliveries on orders already too far ahead to be comfortable. Although the machinery scrapping programmes are very far advanced there is still a feeling in many quarters that it has given rise to an unbalanced state of affairs which could take a long time yet to iron-out. Spinners are all well booked ahead and some types of yarns are unbelievably hard to obtain. Getting rid of the excess spindles and looms has correspondingly drastically reduced the flexibility of many firms to supply customers' requirements from stock or on a very early date. The bulk of the yarns sold have, of course, been home trade accounts, most of the counts being standard weaving qualities in medium numbers on cop, cone, cheese, and ring-beams. Finer counts have been bought better and, although prices are high, some salesmen maintain that the margins are unsatisfactory but dare not risk the effects of increases and less turnover. Shift working has done much to help the steady flow of yarns but the majority of operatives still refuse to accept night work. Coarse yarns are in exceptionally good request and the output now cannot cope with the insistent demands. Condenser types—dyed, bleached or grey—sell steadily. In fact, the major question—and problem—at the moment is how soon can the orders be delivered. Doubled yarns are in good request and more activity has been noticed amongst yarns for the knitting industry. Bulked yarns and novelty effects are well booked months ahead. Just how long this will last is anyone's guess; no industry can permanently tolerate a situation where the prospects of early delivery seem to recede with every passing day.

A similar state of affairs also exists in manufacturing circles. In the last two or three weeks buying has tended to become irregular with the total offtake probably lower than many realise. The available business has not meant any shortening of order books and a wide range of dress cloths have been dealt in, in piece-dyed shades, attractive dobby and jacquard patterns, in cotton and blended cloths, also in extensive ranges in screen and roller printed designs in new shade and colour combinations. Cotton and cotton/rayon furnishing cloths are well supported in novel weave or print designs in traditional or contemporary patterns. Shirtings of all kinds are in keen demand, mainly in the medium price brackets, but the highest qualities in shirtings still want selling and the long order books do not help much in this way. There is also less interest in the cheaper printed striped shirtings. The turnover in household textiles continues very steadily with the long-term prospects better than for some time. Nearly all classes of cotton sheets, pillow-casings, blankets, quilts and tablecloths, etc., are finding ready buyers and this section of the trade could, undoubtedly, ensure a much greater annual out-turn if the retail sections would indulge in real sales instead of the ill-disguised ramp which many of these have become. To continue these sham efforts is simply to insult public intelligence. A little more interest has been noticed in one or two export quarters and slight increases have been shipped to a few Continental customers. Fair weights of industrial fabrics have gone into home trade accounts but activities, on the whole, do little to create unbounding confidence.

Wool Consumption and Prospects

Consumption of wool by the ten chief manufacturing countries of the free world is estimated by the Commonwealth Economic Committee to have increased by 2% in the first quarter of this year compared with the final quarter of 1959. It is estimated, however, that the average daily rate of usage appears to have shown virtually no change. Reductions in the rate of consumption in France, Italy and the Netherlands were partly offset by small increases in the U.K. and Japan, while the position in the U.S. is estimated to have been unchanged. Compared with a year earlier, actual total consumption in these ten countries was 17% higher, though consumption is now found to be levelling out at the higher figure.

Exports of tops from the chief exporting countries in the first quarter of this year were about 6% higher than in the previous quarter and one-fifth larger than a year earlier. Compared with Oct./Dec. quarter, shipments from the U.K. and France—the two largest suppliers—were up by 1 and 2%, while larger proportionate increases were shown by Argentine, Uruguay and Australia. On the other hand, exports from South Africa, West Germany, Switzerland, and Japan were lower in each case.

U.K. wool consumption during May was 2% lower than in April and 6% lower than a year ago, states the Wool Industry Bureau of Statistics. The rate for top-making was 2% lower than April and 6% below May last year. Consumption in the woollen trade was 3% below that of April but only 1% lower than a year earlier. The worsted yarn delivery rate was 2% below April but 1% higher than in May 1959; woven fabric deliveries were slightly higher than in April but 8% lower than a year ago. Output figures for May, a month of 22 working days, were: wool consumption, 45·12 million lbs.; top production, 29·62 million lbs.; tops drawn, 20·30 million lbs.; worsted yarns delivered, 21·30 million lbs.; woven fabrics delivered, 30·40 million sq. yds.; blankets delivered, 2·19 million sq. yds.

Preliminary wool production figures for 1959-60 reported from South Africa by Barclays Bank D.C.O. indicate that the total weight of grease wool sold at auction, shipped direct to London sales from Union and South West African ports, and processed prior to sale at auction or direct export, will be approximately 295 million lbs. This is slightly above the shorn wool production figure of 294½ million lbs. recorded in 1958-59. The bank reports the Wool Board as stating that this increase in the weight of wool sold (contrasting with a decline in the total number of bales offered) was due to a slight increase in the average weight per bale recorded during the latest period.

The total value of the 1959-60 wool clip should be in the region of £50½ million, which is approximately £10 million higher than that of the 1958-59 yield. The average value of the clip increased from 32·9 pence per lb. for all wools during 1958-59 to about 40·9 pence per lb. during 1959-60. During the period July 1st, 1959 to May 31st, 1960, total wool shipments from the Union and South West Africa, adds the Bank, amounted to 832,714 bales of grease wool and 111,566 bales of scoured wool against 733,455 bales of grease and 118,383 bales of scoured wool exported during the corresponding period of the previous season.

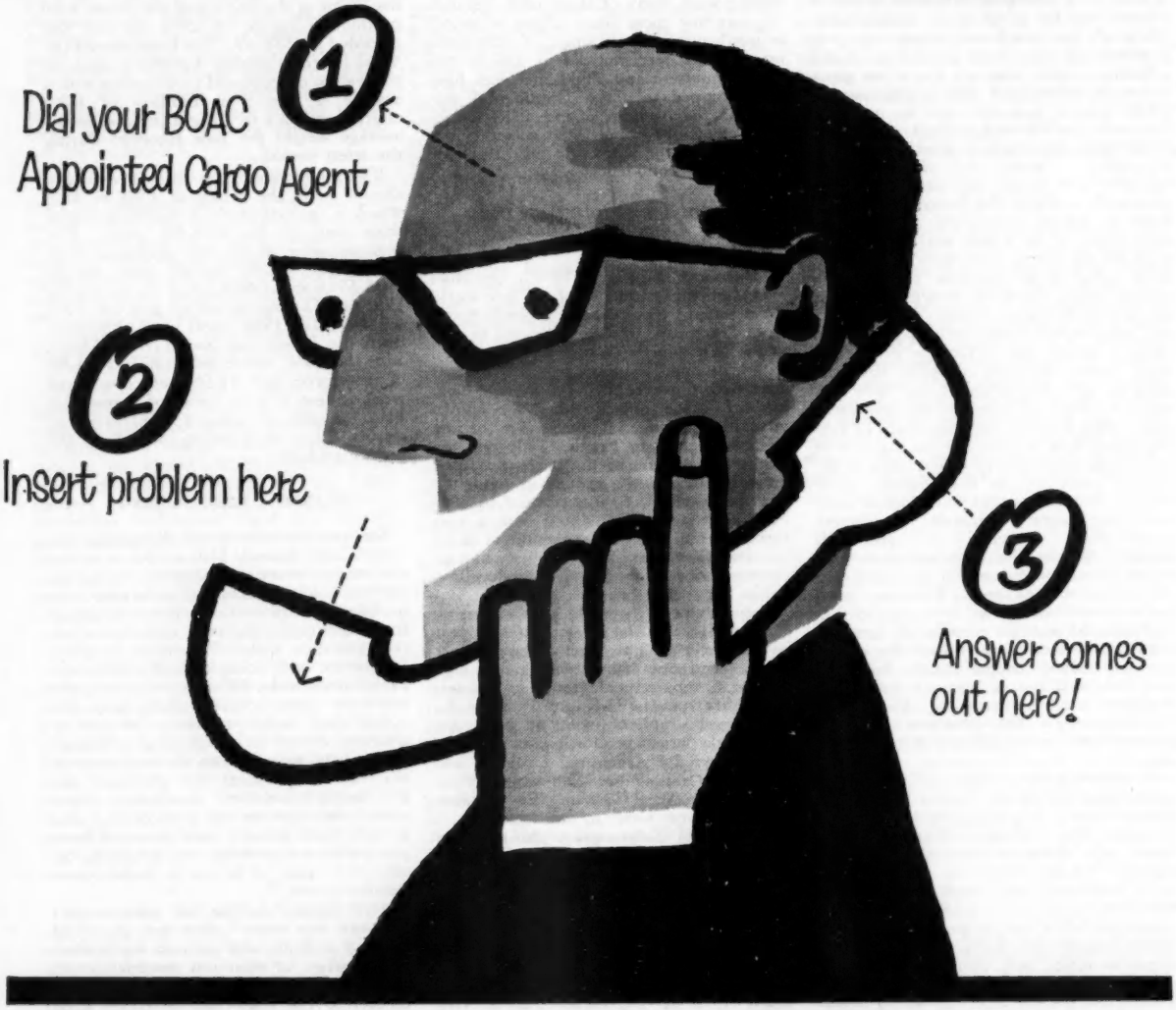
Linen Trade Report

Business has been steady throughout the month, and there is little evidence of the customary seasonal recession. It seems obvious that linen manufacturers, especially in the weaving section, have benefited from the cloth shortage consequent on reorganisation within the cotton industry. Looms are fully occupied and weavers are experiencing some difficulty in securing the necessary yarn cover, particularly for cotton and union orders. Demand is distributed over the whole range of household goods, with interest also sustained in the various products for personal use. Favourable weather conditions have stimulated inquiries for dress linens, and in this field weavers and finishers have combined successfully to produce an attractive range of fabrics at highly competitive prices.

The recent decline in yarn export business has been offset by improved demand at home and spinners are booked to the extent of their raw material cover. Despite this, however, competition in this section of the trade has served to keep profit margins uncomfortably narrow, with little immediate prospect of relief. It seems obvious that, in the market for finished goods, a balance has been struck in the relative values of linen and its competitors, which would react unfavourably on the former if disrupted by any price change. Consequently the main hope of increasing profitability in the spinning section rests in effecting further economies in production by improved processing techniques and/or changes in the economic structure.

Shippers! Here's how to get instant action on

Air Freight problems!



It's like clockwork! Better, really, because no machine could store as much vital freight knowledge as your BOAC Appointed Cargo Agent. No machine could use the human touch to streamline your individual consignment's collection, Customs clearance, handling and delivery as he does.
Next time you ship by air, dial his number—your BOAC Appointed Cargo Agent. Leave the rest to him!

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While the industry has expended over £16 million on re-equipment, much of it in the spinning section, in recent years, this has not been entirely justified by the results achieved. A substantial number of re-equipped and partly re-equipped plants have had to close down in the interim. This loss could have been avoided through concerted action by representative bodies in the spinning and weaving sections in tackling the problem of redundancy to which, even at this late stage, a solution has still to be found.

In the meantime changes are taking place in the internal structure of the industry, more particularly in the spinning section. The pattern is gradually changing from one of a large number of individual units collaborating only to a very limited extent through their trade body, to a small number of groups, some organised horizontally, and others vertically. This reorganisation is still in process, the most recent instance being the acquisition by Messrs. Herdmans Ltd., Sion Mills, N. Ireland, of a controlling interest in the old-established Belfast flax spinning concern of J. and T. M. Greeves Ltd. Last year Messrs. Herdmans Ltd. acquired control of Philip Johnston and Sons Ltd., Belfast. This group of mills, which is integrated horizontally, now controls approximately 30% of the total spinning spindles in the N. Ireland linen industry.

Reports from New York emphasise the value of the Irish Linen Guild's display at the British Exhibition there as a publicity aid to the industry. Emphasis was on colour in linens for household and personal use, the art of the finisher being skilfully represented in the materials shown, which included a wide range of household goods, wearing apparel and handkerchiefs. Many inquiries were dealt with and a substantial amount of business was transacted during the display.

The exhibition of "Terylene"/flax fabrics staged jointly by the Linen Industry Research Association and the Fibres Division of I.C.I. at the Research Institute, Lambeg, N. Ireland, marks a definite break out from the contracting market for all linen products into a wider sphere of textile production, with the vast possibilities—still to be explored—represented by unions with other man-made fibres.

Jute Fibre, Yarns and Fabrics

There has been a decided easier trend in raw jute prices during the past month. This has been due to much better reports regarding the progress of the new crop but at the same time considerably less demand from all main consuming countries has been shown. It was expected that spinners would have to purchase fair quantities of old crop fibre to maintain their production until supplies of new crop were available. This expected demand did not materialise but there is no doubt that a considerable amount of buying will have to take place at a fairly early date.

Much will depend on future trends of prices on the pattern of buying of the larger consumer countries. The fact that the crop is about one month later than usual will make supplies of early harvested fibre rather scarce and it is up to spinners to make sure that during this early period that demand is not in excess of supplies and force prices upwards.

Several adjustments in E.P.C. values have taken place and these have always been in a downward direction. Although prices have declined from £150 per ton for Mill Firsts during June to the present level of £126 there is still ample room for a further drop in values. Spinners are uncertain about the future trend in prices of raw jute and they are remaining out of the market as long as possible and this fact alone is helping to bring values to a more realistic level.

Shippers are anxious for business as so far this season very little new crop raw jute has been purchased. Some sellers are discounting the market well below E.P.C. levels especially for forward shipment. These lower prices are not attracting buyers to any extent and the business passing is confined to small quantities of white jute.

It was announced by Pakistan at the beginning of July that sales of cuttings can now only take place for shipment not exceeding three months ahead. Previously, sales could be made up to six months forward. Long jute has always been under this embargo and it has been the hope of spinners and negotiations with Pakistan that this restriction would be lifted but the reverse has happened with further restrictions imposed in the case of cuttings.

A few offers of old crop fibre are still being made at £126 for Mill Firsts, at £122 for Mill Lightnings, at £116 for Mill Hearts and at £106 for grade Hearts, c.i.f. U.K., for July shipment. Grade Tossa-2/3 was available at £126, grade Tossa-4 at £120 and Continental Tossa-2/3 at £120, July. A few afloat parcels are available at slightly under the above rates.

The difference between old and new crop prices is still fairly wide with Mill Firsts at £125, Mill Lightnings at £117 10s., Mill Hearts at £112 and grade Hearts at £105, c.i.f. U.K., for July/August shipment, at £123, £112 10s., £107 10s. and £102 10s. August/September and at £120, £110, £106 and £101 September/October. A few offers of new crop dark jute are also being made with grade Tossa-2/3 at £118, grade Tossa-4 at £112 and Continental Tossa-2/3 at £108 10s. for September/October shipment and 10s. per ton less would be accepted for October/November.

A considerable potential demand is building up for raw jute and the position at present is very sensitive. On the other hand shippers may not want prices to rise until they have secured a fair position of the crop from growers. At present there is little indication which way values will move and this is making buyers very careful.

The Calcutta goods market has become easier in sympathy with raw material. Some fair orders have been placed by the Indian Government during the past month and this has kept the mills busy. The present lower output of the Indian mills due to shortage of raw material will be made up later in the year.

Quotations are at 69s. 3d. for 10 oz. 40 in., and at 51s. 9d. for 7½ oz. per 100 yards f.o.b. Calcutta for July shipment, at 69s. 6d. and 52s. 3d. August/September and at 67s. 6d. and 51s. 3d. October/December. "B" twills are at 198s., 197s. 6d. and 188s. 3d. for the respective shipment periods.

Prices of Dundee yarns and goods have followed raw material values and substantial reductions have taken place. The lower rates now in force have not brought much additional business and the position may remain quiet until consumers are satisfied that the bottom of the market has been reached for the present.

Spinners and manufacturers generally, are still fairly well supplied with orders from previous business. The floorcovering industries are taking steady supplies of yarns and cloth and there is every indication that this will continue but hire purchase restrictions may slow down this business to a certain extent.

With Dundee spinners and manufacturers now concentrating more and more on specialities there is a more even flow of orders during the year. This is a considerable help to producers for organising their output of yarns and cloth.

The flax industry in Scotland remains busy with most establishments running to the full capacity of the labour force available. Output of canvas is being maintained at a high level and there is every prospect of this continuing in the foreseeable future.

Man-Made Fibres and Fabrics

Shortages of certain types of cloths has been further aggravated with the on-set of annual holidays and orders for some cloths now carry delivery dates up to February, 1961; delivery dates in December and January are common. This situation is not peculiar to weaving sections because spinners also have long order books with requests covering a wide range of counts and blends. The demand for blended yarns spun on Lancashire machinery expands steadily amongst weaving, knitting and tufted carpet manufacturers. The call for acetate, especially for the linings trade and in the ladies' dress trade is heavy at present. "Terylene"/wool blends as lightweight cloths for suitings are in keen request and there is a marked interest in the woollen section in blends of "Acrilan" and "Courtelle" with viscose rayon. "Courtelle" is in particularly heavy demand with knitwear manufacturers.

In the Midlands, the demand for the acrylics is very good. Knitgood manufacturers report order books filled for many months ahead and tending to still expand. Demand for seamfree stockings continues unabated, and probably the only disturbing feature of this market is that some merchandise is not as good as might be desired. Poor quality hose may give a bad name to a class of merchandise, but at the present time there is an eager acceptance by the public of what is offered.

Newer fibres such as Agilon D. are also in steady demand for the knitwear trade, and it is also encouraging to see the continued keen interest in cotton in the knitting sections.

In the Leek area throwsters order books are in a very healthy state. Most classes of high bulk yarns are in demand and there is also a heavy demand for silk yarns. Labour shortage is again a problem, especially in the making-up side where ladies' all-nylon underwear and nightwear is in heavy demand, despite the competitive nature of margins.

The smallwares' section of the industry is busy in a variety of products. Autumn buying has been well up to average, and for scarves in blends of wool/rayon the demand has been good, also in brushed rayon for ladies' nightwear and for children's wear cloths. In sewing threads, the demand for "Terylene" and cotton is again heavy, but all silk and all rayon threads demand a good proportion of the market.

1835 1845 1855 1865 1875 1885 1895 1905 1915 1925 1935 1945 1955

WEAVING *through the years...*

1960

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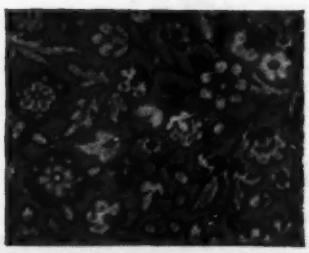
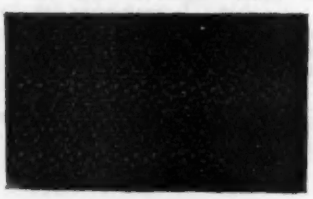
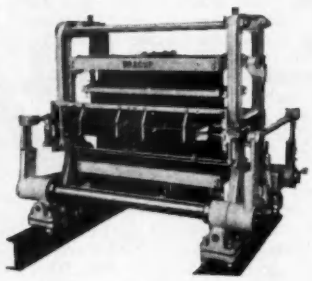
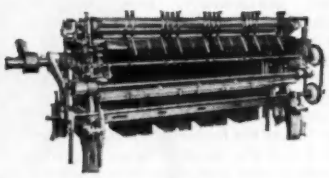


Continuous research is rapidly bringing forward developments that must help in the shaping of your future programme. Our advice is yours for the asking.

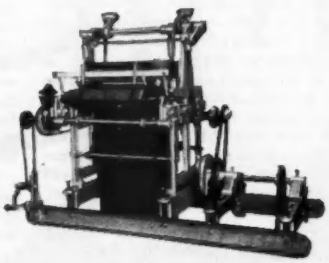




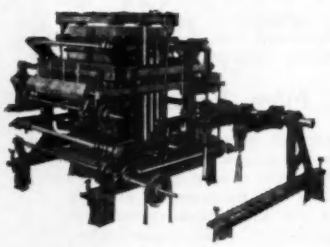
Heavy duty matting Jacquard for SISAL and COIR matting. Available in all sizes up to 24/4.



8/4 Single Wilton Jacquard for high speed production. Machines also available for Double Wilton carpets. Both types supplied any size in any pitch.



New type coarse pitch double lift single cylinder Jacquard. Available in all standard sizes. Double cylinder machines of similar design also available.



3-position Moquette Jacquard for all normal moquette weaves and special float effects.

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Notes and News

Tweed Designers Take More Prizes

Mr. W. Riddle, designer with Edward Gardiner and Sons Ltd., Selkirk, has won first place in the ladies' cloth section of the National Wool Textile Design Competition for 1960. This is the second success for Mr. Riddle in a few weeks, for recently he was awarded a gold medal for one of his designs at the California State Fair, Sacramento. His winning entry was a coat and suit ensemble in two weights of chenille cloth, the coat in 19-20 oz. cloth, brushed back, in charcoal grey with flecks in jewel colours; the suit cloth of finer chenille, 14-15 oz. with clear finish, in matching colours. Third prize in the same section was awarded to Mr. J. Rennie, of John Lawson and Sons Ltd., Kilmarnock (who also figured in the Sacremento awards), while an entry submitted by Mr. P. Simpson, designer with Wilson Bros. (Alva) Ltd., Clackmannanshire, was highly commended.

* * *

New Armstrong Cork Affiliate

Ground was recently broken in Munster for the construction of a plant and sales office by Armstrong Kork G.m.b.H., a new affiliate of the Armstrong Cork Co. which will manufacture and market resilient flooring in Western Germany. Armstrong Kork G.m.b.H. was formed as a subsidiary company of Armstrong Cork International, S.A., an affiliate of the Armstrong Cork Co. with headquarters in Geneva, Switzerland. The ultra-modern plant is expected to be in production by mid-1961. Plans call for the construction of a combination four- and single-storey plant with a nearby one-storey administration and sales office building which will cover a total of approximately 100,000 sq. ft. of floor space. Armstrong resilient flooring is now sold in Germany through distributors in Mannheim and Hamburg. Products of the new plant will be marketed through these distributors, who will be assisted by an expanded Armstrong marketing organisation in Germany which will concentrate on serving architects and the building industry.

Change of Name

Dunlop's Composition Division has been re-named Dunlop Chemical Products Division, a title which more accurately describes the work now being carried out. From it there is a clear indication that an expansion of existing products and an extension into other lines can be expected. General manager of the division is Mr. N. G. Bassett Smith, this year's chairman of the British Rubber and Resin Adhesive Manufacturers' Association. A wide range of products are now being made at the division's factory in Birmingham, among which adhesives, based not only on natural rubber but also on reclaimed rubber and synthetics of all kinds, are a major item. Other products include Polimul, a successful paint base which can also be used as an adhesive. Latex compounds, naturally an important Dunlop chemical line, also provide a versatile manufacturing medium.

* * *

New Dye

"Sevron" Brilliant Red 2B, a bright, bluish-red cationic dye, for use as a base in producing deep jockey red shades on acrylic fibres, is now available from the Du Pont Co. Said to possess adequate light fastness for use on sweaters of "Orlon" fibre with the good resistance to wet treatments characteristic of the "Sevron" dyes, "Sevron" Brilliant Red 2B works well in combinations to produce the deeper shades as browns, charcoals, navies and blacks. The good dyebath stability over a pH range of 3·0 to 10·0, good build-up, level dyeing properties and its yellower, brighter shade under incandescent lighting all serve to recommend this new product for application to acrylic fibre. This product may be stripped to a cream shade with sodium hypochlorite and to an orange shade with sodium chlorite.

* * *

Leavers Lace

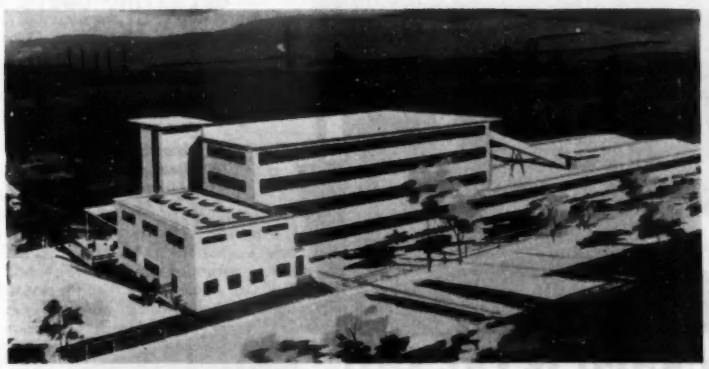
In an attempt to "hall mark" exquisite British-made Leavers lace—made on intricate machines embodying many of the principles originally introduced into the lace machine invented by John Leavers in the early 19th century—a campaign has been initiated by Lace Productions (1948) Ltd., to persuade makers-up and fashion houses to attach a silver-and-black seal or

swing ticket to any garments made or trimmed with this type of twisted lace. Lace Productions (1948) Ltd. is a trading association of 58 British Leavers lace manufacturers situated within an area of ten miles of Long Eaton; also co-operating in the scheme is a Lace Federation committee and the Nottingham lace and Finisher's Association.

* * *

1959 A.S.T.M. Proceedings Published

The American Society for Testing Materials announces the publication of its 1959 A.S.T.M. *Proceedings*, Vol. 59. This 1,424-page volume records the technical accomplishments of the year, including reports and papers, together with discussions, offered to the Society during the year and accepted for the *Proceedings*. The volume includes the summary of proceedings of the A.S.T.M. 62nd annual meeting, June 1959, and the summary of proceedings of the Third Pacific Area National Meeting, September 1959, listing by title and author the programmes for each session. There are 71 reports of technical committees which, together with appendices, provide a wealth of useful information, as do the 44 technical papers and discussions on a wide variety of subjects pertaining to research and standards for materials. An important part of the *Proceedings* are the discussions not previously published which add immeasurably to the value of the technical papers. The annual report of the board of directors highlights matters administrative, technical, and financial and includes a record of meetings held by Society Districts, information on membership gains, publications, honours and awards, and other matters of interest. Copies of the *Proceedings* can be obtained from A.S.T.M. headquarters at 1916 Race Street, Philadelphia, Pa., U.S.A., price $12.00.



Architect's drawing of the new plant and sales office to be constructed at Munster, Germany, by Armstrong Kork G.m.b.H., a new affiliate of Armstrong Cork Co., which will manufacture and market resilient flooring in Western Germany

THAT *Experimental Spring* YOU WANT IS WAITING FOR YOU IN THIS BOX ...

No. 1217. One gross Assorted Springs. A complete Garage Service Kit. 42/- each.

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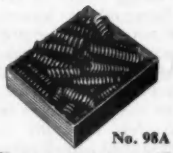
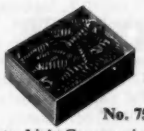
Three dozen Assorted Light Expansion Springs, suitable for carburettor control, etc. 13/6.

No. 760
Three dozen Assorted Light Compression Springs. 1" to 4" long, 22 to 18 S.W.G., ¼" to ½" diam. 6/6.



No. 98A
Three dozen Assorted 1" to 4" long, ½" to ⅞" diam., 19G to 13G. 5/6.



No. 757
Extra Light Compression, 1 gross Assorted, ¼" to ⅜" diam., ½" to 2½" long, 27 to 19 S.W.G. 15/-.

No. 753
Three dozen Assorted Light Expansion ½" to ¾" diam., 2" to 6" long, 22 to 18 S.W.G. 10/6.

No. 758
Fine Expansion Springs. 1 gross Assorted ⅛" to ⅜" diam., ½" to 2" long, 27 to 20 S.W.G. 15/-.

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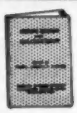

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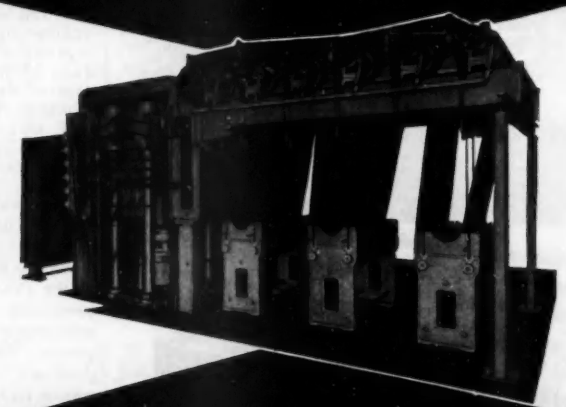

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World Congress of Man-Made Fibres

The following appointments are announced in connection with the Second World Congress of Man-Made Fibres to be held in London, May 8 - 11, 1962, under the auspices of the International Rayon and Synthetic Fibres Committee. Mr. P. S. Rendall (deputy chairman and a managing director of Courtaulds Ltd.) is chairman of the Preparatory Committee. Mr. Rendall is a vice-president of the I.R. and S.F.C., and chairman of the British Man-Made Fibres Producers' Committee. He is also chairman of both British Celanese Ltd. and British Nylon Spinners Ltd., and a director of Snia Viscosa. Dr. H. A. Thomas (a director of Courtaulds Marketing Division) is chairman of the working committee of the Congress. Dr. Thomas was for many years chairman of the technological committee of the I.R. and S.F.C. and manager of Use-Development in Courtaulds. Mr. A. W. Marsden is organising secretary in charge of implementing arrangements. The Congress offices are temporarily at 86 Brook Street, London, W.1.

* * *

Electrical Fair Deferred

Scheduled to be held from September 23 to October 1, at Alexandra Palace, the First Electrical Fair has been deferred; the majority of exhibitors having indicated that they prefer a venue in central London. The organisers hope to make a further announcement in the near future.

* * *

Import Duties on Moquette Fabrics

The Board of Trade are considering an application for an increase in the import duties on moquettes (cut and uncut). A statement of the applicants' case will be made available to all interested parties who wish to make representations in the matter, if they are prepared to give an undertaking to treat the information contained as strictly confidential and to allow their comments to be passed to the applicants for reply. Requests for a statement of the case should be addressed in writing to the Board of Trade, Tariff Division, Horse Guards Avenue, London, S.W.1.

* * *

Miles of Dexion in Mail Order Stores

Over sixteen miles of Dexion slotted angle and 19,000 steel shelves are helping to speed service at Littlewoods new mail order stores at Bolton. The stores which handle everything from electrical equipment to hardware, fancy goods and clothing are in Dove Mill, Deane (formerly a well-known cotton spinning firm), and cover nearly a third of a million square feet. The Dexion units were built by the firm's own staff in six working weeks.

* * *

Woman Heads Wool Firm

A woman has become head of a wool firm and has been informed that if the male membership rule of the Bradford Wool Exchange is relaxed in the future, she shall be the first woman member. Miss E. Robinson has succeeded her father, G. S. Robinson, following his retirement as managing director of George Ingham (Topmakers) Ltd., Elland, Yorkshire. In her mid-thirties, with sound technical knowledge of the wool and topmaking trades, Miss Robinson has assisted her father for the past ten years.

Wool Textile Exhibit in Moscow

The National Wool Textile Export Corporation has started to make preparations for the composite exhibit of wool textiles which it is to stage at the British Trade Fair in Moscow May 19 to June 4, 1961. It has one of the best sites, with an area of 1,500 sq. ft., in the Exhibition Hall in the Sokolniki Park of Culture and Rest, Moscow. This, it is hoped, will be adequate for showing wool cloth, blankets, travelling rugs and handknitting wool, identified as to supplier, from all the firms in the industry which wish to take part. Over ninety firms have replied to the invitations, saying they wish their products to be included in the composite display.

* * *

Japan to Establish Textile Concerns in Rhodesia?

Although there is no confirmation yet Barclays Bank D.C.O. says from its local head office in Salisbury that local reports suggest that Japanese interests are investigating the possibilities of establishing spinning and weaving projects in Rhodesia as a means of overcoming the possible growth of protective barriers against textile imports. The bank says Japanese interest in the Federation has certainly been increasing. Last year Japan bought Rhodesian goods to the value of £5,063,000 compared with only £348,000 in 1958. A trade agreement between the two countries was signed recently.

* * *

Canvas Goods Association

Major Dudley J. M. Smith (chairman of John Smith and Co. (London) Ltd., Romford, Essex, manufacturers of tarpaulins, canvas shelters and vehicle covers, was elected president of the Canvas Goods and Made-up Textiles Association Ltd. for the third time at the Association's recent annual general meeting.

New Companies

G. F. Denby and Son Ltd. Private. Reg. March 31. Capital £5,000 in £1 shares. Objects: To acquire part of the undertaking including the good will and all or any of the other assets and to assume all or any of the liabilities of the business of G. F. Denby and Son Ltd. (in liquidation), and to carry on the business of textile merchants and manufacturers, etc. The directors are: George G. Denby, "Meadowcroft," East Morton, Keighley, and Philip N. Denby, 25 Southlands Grove, Bingley, Yorks. Solicitors: Sampson, Horner and Co., Bradford. Registered office: 56 Little Horton Lane, Bradford 5.

E. W. Bryan Ltd. Private. Reg. March 31. Capital £80,000 in £1 shares. Objects: To acquire the business of hosiery manufacturers carried on at Great Central Street, Leicester, by E. W. Bryan Ltd. (incorporated 1937), etc. The directors are: James A. E. Bryan, Thurcaston House, Thurcaston, Leics.; John C. Condon, 4 Knighton Rise, Leicester; John B. Condon; Mrs. Elizabeth A. Ingall and Winston H. Allcoat. All directors of H. E. Allsopp (Leicester) Ltd. Secretary: W. H. Allcoat. Solicitors: Herbert Simpson Son and Bennett, Leicester. Registered office: Great Central Street, Leicester.

Charles E. Sharp (Velvets) Ltd. Private. Reg. April 1. Capital £20,000 in £1 shares. Objects: To acquire part of the business of Charles E. Sharp (Velvets) Ltd., etc. The directors are: John Thomson Cooper, 373 Lytham Road, South Shore, Blackpool; Kenneth Thomson Cooper, 332 Park Road, Blackpool; Mrs. Eileen M. Duckworth and James Broughton. Secretary: James Broughton. Registered office: 40 Dickinson Street, Manchester 1.

Len Edwards (Imports) Ltd. Private. Reg. April 1. Capital £1,000 in £1 shares. Manufacturers and dealers in textiles of all kinds, etc. Registered office: 39 Great Marlborough Street, W.1.

Holt, Hargreaves and Co. Ltd. Private. Reg. April 4. Capital £1,000 in £1 shares. Manufacturers, spinners, doublers and dealers in cotton, wool, rayon, silk, etc. Registered office: 31 Princess Street, Manchester.

Pendle Plush Ltd. Private. Reg. April 5. Capital £10,000 in £1 shares. Manufacturer of pile fabrics. Registered office: West Hill, Gisburn Road, Barrowford, Lancs.

Prefabricated Felts Ltd. Private. Reg. April 6. Capital £1,000 in £1 shares. Manufacturers of felt, leather, canvas, fabrics and fancy goods, etc. The directors are: Noel Hollingsworth and Mrs. Agnes Hollingsworth, both of "Parklands," Kelbrook Road, Barnoldswick, via Colne.

Melandra Fabrics Ltd. Private. Reg. April 6. Capital £2,000 in £1 shares. Manufacturers and dealers in textiles. Registered office: Knowl St. Mill, Stalybridge, Ches.

W. and S. Textiles Ltd. Private. Reg. April 6. Capital £500 in £1 shares. Manufacturers and dealers in cotton, art silk, etc. Registered office: 41 South King Street, Manchester 2.

J. Lupton (Coloured Tops) Ltd. Private. Reg. April 7. Capital £10,000 in £1 shares. Merchants exporters, importers and dealers in wool, tops, etc. Registered office: Excelsior Mills, Thornton, Bradford.

Briggs Spinners Ltd. Private. Reg. April 8. Capital £3,000 in £1 shares. Woollen manufacturers, etc. Registered office: Lodge Gate Mill, Denholme, Yks.

Fred N. Pollard (Stockinette) Ltd. Private. Reg. April 21. Capital £1,000 in £1 shares. Spinners, manufacturers, and dealers in cotton, or other fibrous substances, etc. Registered office: 6-12 Hammerston Street, Bradford 3.

Ross Bros. (Manchester) Ltd. Private. Reg. April 21. Capital £1,000 in £1 shares. Textile converters, etc. Registered office: 54 George Street, Manchester 1.

R. K. Bradley Ltd. Private. Reg. April 22. Capital £1,000 in £1 shares. Manufacturers, manufacturers' agents, exporters, importers and distributors of wool, worsted, plush, satin, velvet, etc. Registered office: Briar Cottage, Letty Green, nr. Hertford, Herts.

R. Howarth and Co. (Walkden) Ltd. Private. Reg. April 25. Capital £5,000 in £1 shares. Manufacturers of cotton glace yarns. Registered office: Primrose Mill, Walkden, Lancs.

E. W. Davis (Fabrics) Ltd. Private. Reg. April 26. Capital £1,000 in £1 shares. Registered office: 63A Gladstone Street, Leicester.

A. Meredith Jones and Co. Ltd. Private. Reg. April 27. Capital £10,000 in £1 shares. Manufacturers and dealers in cotton, sewing cotton, and thread, etc. Registered office: Cotton Exchange Buildings, Old Hall Street, Liverpool 3.

Blackburn Holden Ltd. Private. Reg. April 27. Capital £10,000 in £1 shares. Cotton, wool and woollen goods merchants, etc. Registered office: Croft House, Barroldswick, Yorkshire.

G. and H. (Dairy) Ltd. Private. Reg. April 27. Capital £32,000 in £1 shares (6,000 1% redeemable preference, 1,000 6% non-cumulative preference, 16,000 "A" ordinary, 3,000 "B" ordinary and 6,000 6% preferred ordinary). Solicitors: McGriger, Donald and Co., Glasgow.

M. and J. Bancroft and Sons Ltd. Private. Reg. April 27. Capital £10,000 in £1 shares. Importers and dealers in textiles, etc. Registered office: 73 Cleveland Street, W.1.

Ernest Fewkes (1960) Ltd. Private. Reg. April 25. Capital £8,000 in £1 shares. Lace convertors. Registered office: 47 Stoney Street, Nottingham.

Barker Clare and Co. Ltd. Private. Reg. April 29. Capital £2,000 in £1 shares. Manufacturers and dealers in cloth, wool, worsted, plush, etc. Registered office: 9 Brydges Road, E.15.

H. R. (Wools) Ltd. Private. Reg. April 29. Capital £1,000 in £1 shares. Spinners, manufacturers, merchants, carbonisers, exporters, importers and dealers in wool, etc. Registered office: 3 Vincent Street, Bradford 1.

W. E. Currie and Co. Ltd. Private. Reg. April 29. Capital £2,000 in £1 shares. Textile designers, etc. Registered office: 9 Oxford Street, Manchester.

Thibifoam Ltd. Private. Reg. April 29. Capital £1,000 in £1 shares. Manufacturers and dealers in textiles, cottons, art silk, pure silk, etc. Registered office: Tubiton House, Medlock Street, Oldham, Lancs.

Alliance Dye and Chemical Co. Ltd. Private. Reg. May 4. Capital £5,000 in £1 shares. Agents and representatives for "Compagnie Francaise Des Matieres Colorantes" of Paris, etc. Registered office: Grecian Mills, Lever Street, Bolton.

A. Zonenclar Ltd. Private. Reg. May 4. Capital £10,000 in £1 shares. Objects: To carry on the business of manufacturers of and dealers in cloth, wool, worsted, etc. The directors are: Nathan Clare and Mrs. Celia Clare, both of 19 South Lodge, Grove End Road, N.W.8, and Sidney Reuben, 4 Northian, Woodside Park, N. Secretary: Mrs. B. Simons. Solicitors: Share, Lewis and Co., S.W.1. Registered office: Sycamore House, 5 Sycamore Street, E.C.1.

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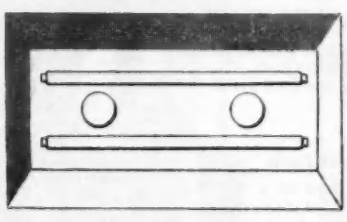

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RECENT TEXTILE PATENTS

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814,526 Dyeing Nylon, "Terylene," etc.

BRITISH RAYON RESEARCH ASSOCIATION, *Bridgewater House, Whitworth Street, Manchester.*

A method of dyeing filaments, fibres, fabrics, etc., of polyethylene terephthalate, nylon, cellulose triacetate or secondary cellulose acetate or other polymeric thermoplastic materials. The material is passed into a dyebath containing a defined dyeing assistant and a dye, padding the dye on to the material, and then passing it through a bed of hot discrete solid particles, while the bed is subjected to an upward gaseous current. The size and weight of the particles, the velocity and nature of the current and the disposition of the material are so chosen that the forces exerted by the current on the particles are sufficient to counterbalance the gravitational force on free particles and to expand the bed, thus allowing movement of the particles, but is insufficient to convert the bed into a uni-directional stream of moving particles. The temperature in the bed is chosen so that the dye is fixed in the material. In one example, four dyebath liquors were prepared each of which contained 5% by weight of Duranol Brilliant Violet BR300 and 0·2% of the wetting agent "Perminal." One liquor contained no assistant, one contained 5% by volume of glycerine, one contained 5% of diacetin, and one contained 5% of triethanolamine. Nylon and "Terylene" continuous filament fabrics were padded through the dyebath liquors, and, after mangling, were passed through a fluidised bed of sand at 195°C., the time in the bed being ten seconds. The dyed fabrics were treated with a hot soap solution to detach unfixed dye and after rinsing and drying were analysed for dye content. The results were as follows:—

% by volume of dye bath assistant	% by weight of dye on nylon	% by weight of dye on "Terylene"
None	1·48	0·93
5% glycerine	1·82	1·34
5% diacetin . .	1·99	1·39
5% triethanolamine . .	1·80	1·15

816,673 Non-Woven Fabric

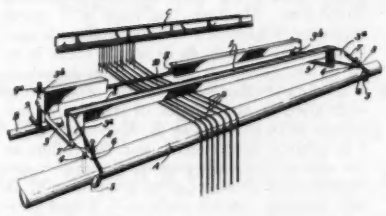
H. W. GRISWOLD, 50 *Dartmouth Road, Longmeadow, Hampden, Massachusetts, U.S.A.*

A non-woven fabric comprising a fibrous web of which the fibres have been rearranged into areas of relatively great fibre density formed by bundles of fibre segments, bordering randomly arranged areas of relatively small fibre density. The re-arranged fibres are in mechanical engagement with one another in unstressed positions and in mechanical equilibrium, and bonded together. In one example, a fairly uniform fabric is formed from a very slightly oriented wet-formed base web by working the web between the hands. The base web comprises 1·5 denier viscose rayon fibres averaging approximately ¾ in. in length bonded with approximately 4% by weight of a uniformly dispersed highly beaten "Mitcherlich" woodpulp binder. Its fibres are arranged to intersect and overlap one another in a non-oriented fashion and the web itself weighs approximately 450 grains per sq. yd. This web may be formed by dispersing the fibres together with the woodpulp binder in water to create a slurry which is then passed through a paper-making machine having an inclined Fourdrinier wire which collects the fibres along with the percentage of binder in the form of a paper-like sheet. After drying, the base web is thoroughly moistened with water and is worked between the hands at an initial moisture content of approximately 250%. The web is bunched, worked, opened, and bunched again, several times or a total working time of about ½ min. At the end of this time a fairly uniform grouped structure is achieved with a very marked increase in bulk and a corresponding decrease in area. As a result of the absence of orientation of the fibres in the base web, the groupings interconnect and extend in a more or less random manner in the plane of the fabric. The increase in bulk is due to the bending and curling of the fibres and the corresponding formation of groups at angles to the plane of the web. The fibres and the groups containing them appear to be curled and sinuous defining voids between them in a fairly regular manner so that the resulting fabric has a knitted appearance. After having been dried, this fabric possesses excellent drape and extensibility and increased permeability to moisture and air.

816,790 Supports for Dropper Pin Mechanism, etc., on Looms

WOOL INDUSTRIES RESEARCH ASSOCIATION, *Torridon, Leeds.*

Describes a method for locating and supporting warp accessory machinery, e.g. dropper pinning mechanisms on looms. The frame comprises, two rails 1 one of which has a rack 2 fitted on the back of its vertical flange which co-operates with the driving medium for machinery using the rails of the frame. The two rails are maintained parallel by the spacers 3 and each outer end of these spacers carries a bracket 3a to which is secured a clamp consisting of a fixed peg 4, and a compressible block 5 and rests on the back rail A of the loom. The block is adjustable by means of the slot 6 on the pin 7 and locked in position to suit the diameter of the back rail by locking nut 8. The inner ends of each spacer carries a bracket 3b to which is attached a foot 9 adjustable in the vertical direction relative to bracket 3b to rest on the crankshaft B or similar loom member, and so bear the weight of frame and machine. A warp depressor tube 10, between the brackets 3b, and supported by strut 11, engages the warp and enables the rails to be positioned at the desired height from the plane of warp D near the heald shafts C. With the depressor tube contacting the warp sheet, the foot 9 is adjusted to bear on B and is clamped in that position by means of the clamp 9a and the weight of the machine on the frame will be carried by the loom member.



817,047 Composite Selvedge Holders

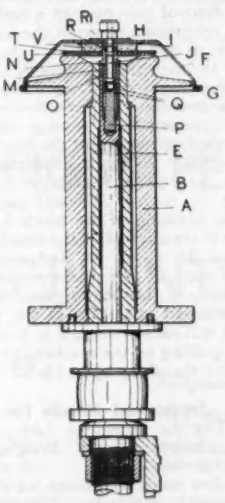
J. DALGLISH AND SONS LTD., *Industrial Estate, Thornliebank, Glasgow.*

Relates to selvedge holders for holding the selvedges of a fabric, for example, when conveying the latter through a finishing machine. A composite selvedge holder comprises a body, a fixed plate and a movable clip member mounted on the body and adapted to co-operate in holding the selvedge of a fabric. A rocker member is mounted on the body and is adapted to support pins for holding the selvedge of a fabric. A tumbler is mounted on the body for swinging movement between two limiting positions to move the rocker from an inoperative to an operative position and to lock it releasably in either of the positions.

817,217 Improved Flyers for Uptwisters

ARUNDEL, COULTHARD AND CO. LTD., *Sovereign Works, Stockport.*

Describes an improved flyer, particularly for use in uptwisting machines using double flanged bobbins. The flyer com-

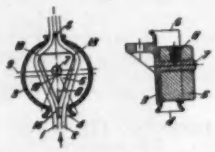


prises a metal cap *f*, in the edge of which is secured a yarn guide *g*, and there are metal plates *h* and *i* secured to the upper and lower sides of the cap. A spindle *j* is secured to the cap and revolves within a sleeve *m* which has a flange *n* to rest on the top of the spindle blade *b* and of a bush *o*, and also has a part *p* which extends into the spindle, with a balloon spring *q* between the part *p* and the spindle. A steel washer *r* held in place by a circlip *r1* holds the flyer and associated parts in their service positions. When it is desired to withdraw the flyer and associated parts from the spindle, a sharp pull on the flyer will cause compression of spring *q* so that it will pass through the bush *o* and allow withdrawal. Disposed around the member *m* is a plate *t* to the underside of which a pad *u*, is secured and to the upperside of which a pad *v* is secured. The pad *u* rides on the top of the bobbin *a*, and the plate *i* on the underside of the flyer rides on the add *v*.

817,248 Control Device for Rovings in a Spinning Machine

A. P. GRIFOLL, J. S. CASAS and R. V. SALVANS, 7, 4 , 1*a Calle Miguel Bleach, Barcelona, Spain.*

A device for controlling the passage of rovings to a spinning machine. The device comprises a cup-shaped housing 3 formed with two opposite lipped apertures 4 and 6. The housing has a circular stud 7, and a prismatic block 5 having isosceles triangular opposite end faces, is mounted on the stud. The apex 14 of the block is directed towards the aperture 4. The axis of stud 7 is offset from the geometric centre 10 of the housing and of the block 5, along the line 8 towards the aperture 6 by a distance 9. A spring-loaded catch 11 in a recess of

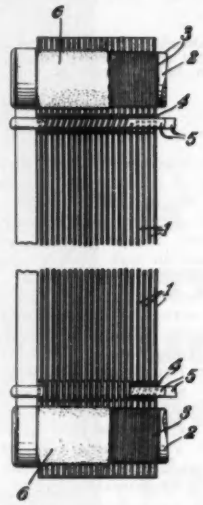


the block 5, engages with an arcuate notch formed over part of the periphery of stud 7 so as to hold the block in the housing whilst allowing for limited movement of the block about the stud. The device is placed in the path of feed of two rovings 1 and 2. The rovings are passed through the aperture 4 and then to opposite sides of the block 5 and out through the aperture 6. If one of the rovings, say roving 1, were to break, the balanced position of block 5, due to the equal pressures of the rovings exerted on the rounded corners 13 of the block, would be unsettled. The discontinuation of pressure by roving 1 and the continued pressure by roving 2 would cause anti-clockwise pivoting of the block 5 so as to shift the sharp apex 14 of the block towards the point 15 so as to wedge roving 2 between apex 14 and the internal rim of the housing 3 forming a plane of entry. The continued operation of the spinning machine will cause roving 2 to break either through pulling by the machine or through cutting by the sharp apex 14.

817,495 Improved Reeds for Looms

WOOL TEXTILE SUPPLIES LTD., *Spencer Road, Lidget Green, Bradford,* and F. WILKINSON.

Describes reeds for looms which are of an improved construction. The reed wires 1 are held between baulks 2 which are bound together by spun yarn 3. The yarn spaces the reeds from one another and are then impregnated or covered with latex or



similar elastic adhesive which also covers, and fills the spaces between, the ends of the reed wires. A coiled wire 4 extends across the reed embracing the wires and also two metal packing strips 5 which lie on either side of the wires, the coil separating each reed wire from its neighbours. The impregnation may be done by applying the latex under pressure and may leave a surface coating 6.

817,665 Creel Bobbin Holders

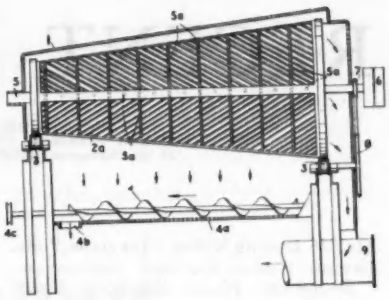
CASABLANCAS HIGH DRAFT CO. LTD., *Bolton Street, Salford.*

Creel bobbin holders for spinning machines, the holders being of the rotary suspension type having a spindle-like body which can be arranged in a dependent position for engagement in a bobbin core, a collar which surrounds the body to abut an engaged core end under spring influence, and a body catch which can be rotated into or out of a transverse bobbin retaining position by causing the collar to slide along the body. A development of these holders provides a creel bobbin holder which the body catch is arranged for rotation by catch operating means, including a resilient operating member which is connected to the collar so as to move with it in both axial directions along the body.

817,682 Waste Shakers

PNEUMATIC CONVEYORS (HUDDERSFIELD) LTD., *Willow Lane, Huddersfield,* and E. C. BARRACLOUGH.

Improved shaker for cleaning fibres, whether natural or synthetic, comprises a casing 1 and a conical cage 2 open at each end and mounted upon channelled rollers 3 which locate the cage against horizontal movement. Beneath the cage is a worm conveyor 4 having a driving pulley 4*c* and located in a trough 4*a* in which there is an outlet 4*b*. Through the cage extends a shaft 5 carrying beater arms 5*a*, the shaft being journalled on the outside of the casing and driven through a pulley 6. A second pulley 7 is secured to the shaft, and the rollers at the end of the cage nearest the pulley are mounted on an axle carrying a pulley 8. A belt extends around pulleys 7, 8 and provides a drive to the cage in a direction



counter to the direction of rotation of the beater arms. Material fed into the narrow end of the cage by the suction pick-up moves along the cage towards the wider end and is thrown about by the beater arms. By virtue of the counter rotation of the arms and the cage, the lowest part of the cage surface is changed continuously and the dirt falls down to the trough through the cage. The cleaned material passes out of the cage, and is taken up by a suction unit 9 and passed, if desired, direct to a main blend or blender.

817,815 Electronic Spinning Mules

T.M.M. (RESEARCH) LTD., *Hartford Works, Oldham.*

Improvement of the electronic spinning mule described in B.P. No. 732,665. The control mechanism for applying the voltage shaping circuits to the variable speed driving mechanisms driving the carriage and the spindles, comprises a selector switch arranged to be intermittently rotated under the control of switches operated by moving parts of the mule.

817,915 Hydraulic Shuttle-Checking Devices for Looms

A. E. ZARN, *Im Buch* 374, *Wurenlos, Switzerland.*

A hydraulic shuttle-checking device for use in looms wherein the piston and cylinder are arranged to have a stroke for checking a shuttle, which stroke is less than the full stroke available. Means are provided which are connected to a driven member of the loom and to the piston, for the purpose of pushing the piston its full distance into the liquid cylinder after the checking is complete but before box changing.

818,479 Slub-Catcher for Yarns

JUTE INDUSTRIES LTD., *Dundee,* and J. S. PLENDERLEATH.

A device for catching or removing slubs, loose fibres, projecting roots and like irregularities in yarns. The device comprises a guide bar adapted to form with an adjacent member a slot through which the yarn passes, the guide bar having a yarn-engaging face and grooving in the face. The grooving extends transversely of the direction of movement of the yarn through the slot, and forms with the face, yarn-cleaning and slub-catching edges.

818,492 Waterproofing of Sheet Materials, etc.

CALICO PRINTERS' ASSOCIATION LTD., *St. James's Buildings, Oxford Street, Manchester.*

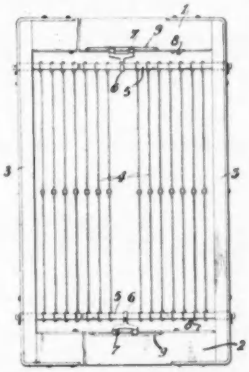
The application to fibres, yarns, and fabrics composed wholly or partially of substances of vegetable or animal origin,

either natural or regenerated, to render them water-repellent. Derivatives of 1 : 3 : 5-triazine are applied, in which the carbon atoms carry as substituents, at least one halogen atom and at least one —NH— alkyl group containing more than 10 carbon atoms, and have no substituents possessing solubilising groups. Reaction with the material is effected preferably in the presence of an acid binding agent. In one example, a cotton piece was padded through 15% sodium carbonate solution to a 130% expression and dried. It was then padded through a solution of 5·0 g. of crude 2-stearylamino- 4 : 6 - dichloro - 1 : 3 : 5 - triazine (prepared by reaction of stearylamine and cyanuric chloride at low temperature in the presence of alkali) in 195 g. chloroform to a final expression of 117%. After removal of the solvent, the cloth was steamed for 30 mins., followed by washing in hot water for 10 mins. The cloth had an excellent water repellent finish which was further improved by washing in hot soap solution and was fast to dry cleaning in trichlorethylene.

818,631 Loom Heald Frames

WOOL TEXTILE SUPPLIES LTD., *Spencer Road, Lidget Green, Bradford.*

Loom heald frames in which wire healds are slidably mounted on rods carried by the side members of the frame. The heald frame comprises upper and lower staves 1, 2 connected by means of side members 3. The wire healds 4 are mounted on rods 5 which pass through the side members.



The rods 5 are supported at intervals by hooks 6 connected to sleeve-like members 7 slidable on flat metal strips 8 secured to the inner face of the upper and lower staves. In order to allow a clearance space for the sliding of members 7 between the staves and the metal strips, the staves are cut and recessed at spaced lengths 9 along their inner faces.

818,950 Twisting Device for Bulked Yarn Production

ERNEST SCRAGG AND SONS LTD., *Sunderland Street Works, Macclesfield.*

Concerns the twisting and crimping of yarns, and is especially concerned with imparting false twist for the production of crimped yarns from yarns composed of endless synthetic filaments. The longitudinally moving yarn is continuously twisted by frictional engagement between it and a surface of revolution moving at right angles to the yarn axis at the locus of contact. The yarn is thus rolled round about its own axis relative to the frictional surface, so that the amount of twist will depend directly upon the linear relative speed of the surface and inversely upon the circumference of the yarn. In order to ensure adequate frictional engagement, the yarn may be urged by its own tension into rolling contact with a moving friction surface of convex arcuate profile, or it may be more positively engaged by the provision of a pressure surface urged towards the friction surface with the yarn between. Two friction surfaces moving in opposite directions may be used and these may, if desired, be arranged so that each constitutes a pressure surface relative to the other.

819,100 Improved Drawing Roller for Spinning Frames, etc.

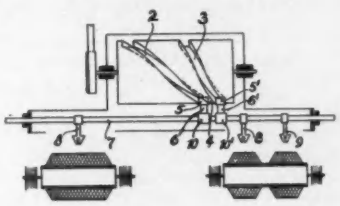
SOCIETE ALSACIENNE DE CONSTRUCTIONS MECANIQUES, 32 *Rue de Lisbonne, Paris 8e, France.*

A drawing roller is mounted on a bushing of porous metal impregnated with lubricant, preferably "self-lubricating" sintered metal, which is perfectly sealed against the ingress of dust, so that the roller is able to operate during a considerable length of time without any dismounting for cleaning purposes and without renewal of lubricant. The sleeve which usually carries the roller, is mounted on a bushing made of self-lubricating sintered metal and having a convex outer bearing surface of short axial length and short radius of curvature, and a cylindrical inner bearing surface, adapted freely to rotate on a non rotary supporting shaft. Provision is made for means adapted to position the bushing axially with respect to the shaft, means for positioning the roller axially with respect to the bushing, and sealing means between the shaft and the inner wall of the sleeve. The sleeve may contain a reserve of lubricating oil, preferably felt pads impregnated with oil.

819,143 Winding Machine Traversing Motion

INDUSTIE-WERKE KARLSRUHE AKTIENGESELLSCHAFT, *Gartenstrasse* 71, *Karlsruhe, Germany.*

A traversing motion in a machine for winding synthetic yarns to provide for the winding of a single thread or two threads separately and simultaneously into different package forms, without it being necessary to provide interchangeable cam cylinders. The traversing motion comprises a cam cylinder which has a first cam path 2, for winding a single thread, with a throw of, for example, 160 mm., and a second cam path 3, for winding two separate threads, separately and simultaneously, with a throw of, for example, 80 mm. A ridge 4 is formed between the two cam paths, thus



ensuring their stability. Inserted in either one of the cam paths is a roller 5 carried by an arm 6 secured at 10 to a traversing rail 7. The rail 7 is mounted in bearings and carries thread guides 8 and 9. When it is desired to wind a single thread into a single package (see left-hand side), the roller 5 is engaged in the first path 2, the arm 6 secured at 10 and a single thread guide 8 for engaging the thread is secured on the rail 7. When it is desired to wind two threads separately and simultaneously into two packages (see right-hand side), the position of the arm 6 is moved to 6_1 and tightened at 10_1, the roller 5_1 being engaged in the path 3 having the shorter throw. The two threads are engaged with separate thread guides 8 and 9 on the rail 7. Owing to the short throw of the path 3 the threads are wound into two packages on the one bobbin.

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